

of the Aegean area stimulated navigation. Seafaring traders from the eastern Mediterranean were attracted to the Aegean by way of the southern coasts of Asia Minor, and brought knowledge of Near Eastern and Egyptian forms. An important civilisation developed on the island of Crete, and in its turn spread to the mainland, stimulating the communities adjacent to the Aegean. By the fourteenth century BC the centre of power and influence had shifted to the Greek-speaking mainland, only to collapse in disarray and poverty by the end of the twelfth century BC. During this period Greeks had migrated from the mainland, across the Aegean to the coastal regions of Asia Minor, and to Cyprus; in the period of revival which followed, a more extensive movement overseas took the Greeks to North Africa (Cyrenaica), to the coasts of the Black Sea, and above all to southern Italy and Sicily. These communities contributed to the development of Classical Greek architecture, often forming distinctive regional variations, that of Sicily and Italy being in its turn influential on the forms developed in Italy in the Etruscan cities and, eventually, Rome. Subsequently, the establishment of Macedonian supremacy over Aegean Greece by Philip II and the conquest by his son, Alexander, of the Persian Empire greatly extended the area of Greek political—and thus intellectual and artistic—domination. Greek architecture, stimulated by Egypt and the Near East, was itself the stimulator of Roman and later European architecture. To all the arts, to literature, and to science, the Greeks brought to bear remarkable qualities of intellect and aesthetic judgement; the architecture of ancient Greece fully demonstrates the levels of their achievement.

Physical Characteristics

Egypt and the Near East

Three broad zones comprise the greater part of the Near East. To the south lies the Arabian peninsula, with its desert extending northwards into Syria, though with fertile highlands in its southernmost region, the Yemen; in a great arc stretching from the Mediterranean coastal plain and the hill country of Palestine through north Syria and Iraq to the head of the Gulf, lies the zone of grasslands, steppes, the Piedmont (foothills) and alluvial river plains known as the Fertile Crescent; and for 2400 km (1500 miles) from west to east extends a chain of mountains and plateaux from the Taurus range and central plateau of Anatolia through the mountains and lakes of eastern Turkey and north-western Iran to the parallel ranges of the Zagros highlands, dividing the wide Iranian plateau from the plains of Mesopotamia. The coastal regions of the Aegean, southern Turkey and

the Levant are typically Mediterranean, once forested but now largely denuded of trees. A heavily forested belt stretches along the Pontic coast, the south Black Sea littoral, the south coast of the Caspian Sea being subtropical in vegetation. To the north the Caucasus range forms a clearly defined frontier of the Near East, both environmentally and culturally.

The environment of Egypt was uniquely favourable to early settlement and the development and survival of a centralised state, comprising as it did the long, narrow valley of the Nile, its rich alluvial soil bounded on each side by the arid desert, beginning either with a gentle slope or with a marked escarpment. Whatever the precise local topography, the line between the 'Black Land' of the valley and the extensive delta and the 'Red Land' of the desert was sharp and clear. The reason for this was the lack of any other water supply than that provided by the Nile, a majestic, slow-flowing river, supremely reliable from one year to the next, yet carrying only one-fifth of the volume of silt brought down in a good year by the River Tigris. One outcome of the distinctive form of the settled zone of Egypt was that towns and villages were strung out over long distances, comprising loosely connected compounds. Physical environment and political security alike rendered densely concentrated, walled cities, characteristic of Mesopotamia, inappropriate. Outside the Nile delta (Lower Egypt) these never developed significantly, while evidence of early periods of occupation in the delta lies buried beneath later deposits. Indeed the record of ancient Egypt is overwhelmingly that of the long Nile valley (Upper Egypt), the two regions retaining the memory of their prehistoric existence as separate political entities. In antiquity Egypt proper ended at the First Cataract, where the Nile descends over a band of granite at Aswan; upstream lay Lower Nubia, as far as the Second Cataract, a far more formidable natural barrier and a readily defensible frontier, the present-day border between Egypt and the Sudan.

The climate of the Near East, the Aegean region and Egypt can largely be described in terms of present-day conditions, as changes over the past five millennia or so have been for the most part localised. In the closing phases of the Pleistocene era and following the last glaciation the Near East was, on the evidence provided by analyses of pollen traces in sedimentary deposits, rather colder and drier than today and the tree line was at a lower altitude. In the Levant, sheltered from the effects of the glaciation, thriving stands of trees survived.

There are indications of a climatic optimum in western Iran and Mesopotamia, if not throughout the Near East, round about the middle of the fourth millennium BC. Conditions became rather warmer and more humid, encouraging wider distribution of settlements. The level of the Persian Gulf, and thus

by implication general sea levels, rose to about one metre above present-day levels. The tree cover in highland areas rapidly extended. To what degree, if any, this can be seen as a factor directly favouring the rise of towns and cities in southern Mesopotamia is perhaps still a matter for speculation. Rather would such a climatic improvement have stimulated wider distribution of settlements, not their concentration in larger but fewer communities; in other words, the growth of villages rather than towns. In fact such a development is discernible slightly earlier in Mesopotamia, during the fifth millennium BC, preceding the so-called Urban Revolution.

Much of the Near East is balanced on a knife-edge between adequate and insufficient rainfall; in the highland regions this is supplemented by snow, occurring as far south as the hills above Petra, in southern Jordan.

Natural regeneration of forests has been curtailed as a result of over-grazing over a long period. Slash-and-burn agriculture, so common in tropical Africa, was probably never significant in the Near East. The worst destruction of forests has of course occurred with the felling of timber for building or shipbuilding purposes, a process hardly extensive enough to have had significant effects before Classical times.

The development of a settled way of life took place around this 'fertile' crescent. The earliest villages appeared on the foothills of the Piedmont, where rainfall was adequate and the grazing good. Human occupation of the Zagros and Taurus regions was sparse, but their natural resources played a major role in early agricultural economies. In the northern Mesopotamian plains the climate was more arid, and rainfall was not sufficient for crop-growing without irrigation except between the Euphrates and the Tigris. But it was on the southern Mesopotamian alluvium, inhospitable though fertile if irrigated, that the first complex societies of south-west Asia evolved.

Habitation in the Epipaleolithic (20,000-10,000 BC) was in caves and impermanent open campsites. Most structures were of a perishable nature. The Natufians of the Mesolithic period moved seasonally to exploit a wide range of natural resources. Certain sites served as more permanent bases for recurrent visits over many years and it was here that more permanent buildings were developed. Neolithic settlements prior to 5000 BC were located with regard to the availability of local resources.

Predynastic Egypt was shaped by its more stable climate and the dominance of the Nile. The Nile valley, a narrow strip of alluvial plain bordered by desert, was one of the world's richest ecological niches. Above Cairo, the strip varied from 3 km to 22 km (2-14 miles) across, with a sharp division between the desert and the alluvium. North of Cairo extended the delta, 165 km to 250 km (103-155 miles) across, lush, well-watered and fertile. Temperatures rarely exceeded 38°C, but rainfall was sparse, and

irrigation was required for agricultural production. The heat and humidity were suitable for a wide range of plants. The deserts were rich in natural building stone and minerals and shielded Egypt from external influences, but the river was an efficient means of internal communication. Settlement took place around the head of the delta, and along the river banks in the less hospitable environment of Upper Egypt.

Unlike Egypt, Mesopotamia lacks natural defensive boundaries: on the west it shades gradually into the undulating steppes of the Arabian desert, while on the east the valleys and foothills of the Zagros ranges were fertile enough to nurture neighbouring peoples watchfully envious of the richer living offered by the Mesopotamian plains. After the melting of the snows in the highlands to the north, the Tigris, though not always reliable, floods in the spring and the Euphrates a few weeks later, in May. The gentler current of the Euphrates made an easier means of communication and trade and a more favourable setting for the early rise of urban communities. The two great rivers deposited their silt over the flat plain, forming natural banks or levées and frequently changing their courses: thus a network of watercourses divided the plain. It was these secondary channels which were tapped as sources for irrigation in the earliest periods of settlement from the mid-sixth millennium BC onwards, but which steadily decreased as the main rivers were progressively brought under control by the cities and towns. From about the same time the Gulf ceased its relatively rapid expansion northward and a slower retreat began, leaving a fringe of marshes round the head of the Gulf.

Between the early city-states with their fertile agricultural lands lay barren stretches of steppe, providing natural frontiers: not all the land represented on maps as low-lying in Mesopotamia is necessarily fertile, or ever has been. Conditions range from those akin to the Aegean region, as in western Anatolia, to the harsh continental extremes of eastern Anatolia and to the arid interior of Iran, its mountain ranges enclosing two deserts. Centres of population tended to be concentrated in certain more fertile plains, including that of Erevan in the Araxes valley, the river now forming the frontier between Turkey and the Armenian SSR.

Syria was open to influences from all directions in that it had access to the maritime trade across the Mediterranean; it was also on the highway from the Anatolian plateau to Egypt and lay athwart the middle reaches of the Euphrates, thus being accessible to and from the cities of Mesopotamia. Much of Syria is very fertile, along the coast and inland, east of the mountain ranges of Lebanon, Anti-Lebanon and Amanus; but further east the landscape shades into desert, green only briefly after seasonal rains.

Until our own century the annual inundation of the

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Nile from July to October enriched the black land, as the ancient Egyptians called the valley and delta, with fresh deposits of silt, maintaining the quality of the soil. In recent years dams have undoubtedly affected local climate. Just as the disappearance millennia ago of extensive inland lakes, as from the Konya plain of Anatolia, must have reduced annual precipitation, the creation of artificial lakes in the form of reservoirs on the whole has the opposite effect.

Agricultural activities based on the longer perspective are generally beneficial to the environment, as exemplified by the terrace-building so characteristic of much of Syria and Palestine from Canaanite and Phoenician times onwards. It prevented erosion, which has so widely stripped the hillsides down to the bedrock, rendering them useless for food-production.

Egypt was uniquely protected from foreign incursions, with but one route from the Red Sea and another into the eastern delta. Successive Pharaohs organised expeditions to exploit the mineral resources (copper and gold) of the Sinai peninsula and the eastern desert.

The geology of the Near East is immensely varied, having a far-reaching effect both on the vegetation cover and on the character of public and even vernacular architecture, through the availability or absence of suitable building stone. Limestone dominates the landscape of northern Egypt, much of the Levant and parts of the highland zone, where, for example, the citadel of Van is built on a mile-long ridge of hard crystalline limestone. In Upper Egypt sandstone predominates. Basalt formations extend over wide areas of Jordan and also of eastern Anatolia, resulting in extensive tracts of stony desert or barren uplands. Recent volcanoes have occurred across the Anatolian plateau as far east as Mount Ararat. The Van region exemplifies the great variety of geological formations in Anatolia, with andesite, limestone, schist, basalt and red volcanic tuff. Across northern Anatolia, from east to west, extends a zone all too often liable to suffer severe earthquakes. Regions of inland drainage create salt pans and heavily salty lakes, notably the Dead Sea, Lake Urmia in north-western Iran and the Salt Lake in central Anatolia, while the Dasht-i-Lut (Salt Desert) and the Dasht-i-Kavir (Great Desert) extend over much of the interior of central and eastern Iran. Perhaps the greatest impact of local geology on human settlement in the Near East is an indirect one related to the location of water supplies, especially springs.

Greece and the Greek Empire

The climate enjoyed by most Greek cities is, of course, that of the Mediterranean. Winters are short,

and severe periods limited in duration though more extreme in the mountains of central Greece, the north Aegean, Thrace and the Black Sea. Rainfall is generally adequate, and occurs in autumn, winter and spring, often in heavy storms—the summers are hot and dry so that the resulting clear air and intense summer sunshine made it possible to appreciate the fine details of Greek buildings, enhanced by carving and colour. The interiors of buildings were designed to provide relief from the intense light and heat of summer; temples received light only through their doors, while in other buildings windows were generally small, and normally opened not to the street but onto inner courtyards which were frequently surrounded by roofed porticoes. Much public activity took place in the open air, even in the winter months. Shade from the summer sun, shelter from the winter rains were desirable but not essential, and the structures which provided them were luxuries, and developed late. Nevertheless, if the temple was the building for which Greek architectural forms were originally developed, it was the extended roofed portico or stoa which became the most widespread and numerous by the end of the Classical period, and particularly during the final Hellenistic period.

The Greek lands are mountainous, and prone to earthquake. The present geography was formed by the sinking of the Aegean basin through earth movements; the islands of the Aegean are, most often, formed from the tops of submerged mountains. The mainland is indented by long inlets of the sea, particularly the substantial eastward-facing Gulfs of Argos and the Saronikos (Saronic); the latter is separated only by the narrow Isthmus of Corinth from the long westward-facing Gulf of Corinth, which provides sheltered navigation for a considerable distance, and certainly stimulated the development of western trade, so that the city of Corinth flourished as a result. There are few substantial rivers, and these are not navigable; their benefit is rather for irrigation. In southern Greece, south of the Isthmus of Corinth (the Peloponnese), the important rivers are the Eurotas and the Alpheius, which rise in the central plateau of Arcadia and flow, respectively, to the south, through the district of Laconia and past the city of Sparta, and to the west, through Elis and past the sanctuary of Olympia (p.7). North of the Isthmus the important rivers are in the west (the Mornos and Achelous) and to the north: the Peneus, which drains the plain of Thessaly and then flows through the spectacular gorge, the 'Vale' of Tempe; and the large rivers of Macedonia and Thrace, the Haliaemon, the Axios and the Strymon. The valleys of the last two give access to the Balkan peninsula. The eastern Greek settlements were on the coast of Anatolia, mostly where the substantial rivers flowing from the Anatolian plateau to the Aegean, the Caicus, the Hermus and the Maeander, broaden out into wide, rich alluvial valleys. The homelands of the Greeks

are divided by inlets of the sea and mountain barriers into distinctive regions, each with its own area of cultivable plain which provided the basic livelihood for the inhabitants. The size and importance of the community depended firstly on the area of its cultivable land, secondly on the ease with which adjacent communities could amalgamate into larger units. (The important city-states of the Classical period were all amalgamations of this type). In their overseas settlements the Greeks most naturally selected a region of similar geography, and, until the conquests of Alexander, never at any distance from the sea.

History

Egypt and the Ancient Near East

The scale of society in the Mesolithic age was small. Natufians lived in groups of three or four households, with no marked differentiations in wealth or status. They engaged in small-scale trade or barter for luxury items like shell ornaments and obsidian for salt. The wide distribution of the culture was not mirrored by political unity. In the Neolithic period there were villages with populations numbered in hundreds, but village life was still largely self-sufficient, and politically and economically independent. The lack of a public architecture has been taken as evidence of the absence of a centralised polity. During the period 8000–6000 BC, population densities increased. The settling of nomadic populations may have played some part, but the absolute increase in numbers was also due to increased agricultural productivity. The period 6000–3500 BC was a formative one, during which population densities again increased; pottery and other artefacts emerged, and trade prospered.

The colonisation of the southern Mesopotamian alluvium after 5300 BC, with the need for irrigation, may have led to increased social complexity in this region and to the creation of greater surpluses and greater occupational specialisation. At any rate, by 4500 BC public architecture and cities characteristic of more complex civilisations had arrived. The Ubaid period produced a uniform architecture over most of the alluvium, and its influence extended throughout the surrounding regions. Settlements were located on reliable watercourses and almost all were at least 10 ha (25 acres) in extent. The temples of the Ubaid period were evidence of increasing cultural complexity in the diversion of resources into public architecture, and by the close of the prehistoric period some towns were approaching the status of city-states.

In Egypt, the proto-agricultural period of 12,500–9500 BC did not lead to agriculture. To all intents and purposes Egypt was two independent kingdoms, with

the northern capital at Buto and the southern capital at Hierakonpolis. The kingdoms were virtually autonomous politically and administratively. Towards the end of the predynastic period, however, there were moves towards political unity brought about by the development of the institution of kingship. There is evidence that artefacts and craft techniques were imported from Egypt and the Near East.

Although it was in the Nile valley that the oldest major continuing and highly centralised monarchy emerged around 3200 BC to be ruled by the Pharaohs of Egypt for nearly three millennia, it was in the cities of southern Mesopotamia in Sumer in the middle of the fourth millennium BC that writing first seems to have been developed and that the longest historical records can be found. The archaeological evidence suggests that the Sumerians had been occupying the land from the first settlement of Eridu, by historical tradition the oldest city of Sumer, for two millennia before the earliest writing appeared. With the seizure of political control by Sargon of Agade (c. 2340 BC), the Akkadian dynasty was established, ruling over indigenous Sumerians and incoming Semitic Akkadians alike. Three new developments occurred: first, political unity was imposed by force on the warring city-states; second, the status of the ruler was deliberately exalted, the king claiming divinity in his lifetime and provincial governors being appointed and styling themselves 'slaves of the god'; third, trade beyond the confines of Mesopotamia—first developed in the later fourth millennium BC (Late Uruk period)—was revived by expeditions led by the king, their purpose as much economic as military. Moreover, the Akkadian language steadily extended its hold on Mesopotamia and in due course became the language of diplomacy as far afield as Egypt until the rise of Aramaic in the last century of the Assyrian empire. The Sumerian language and literature left a widespread legacy: for example, the links with the scribal schools of Mesopotamia apparent in the archives of the burnt palace of Ebla in northern Syria. There was a final revival of Sumerian civilisation in its homeland under the powerful Third Dynasty of Ur, at the end of the third millennium BC.

Contemporary archives from the age of Hammurabi of Babylon (1792–1750 BC) have been recovered in enough cities to demonstrate the brief phenomenon of an international balance of power, recognised as such at the time. The famous code of Hammurabi sheds light on the rules governing trade, land tenure, feudal service, taxation, slavery and the organisation of labour, and emphasises the growth of the power of the secular ruler or palace in relation to that of the temples, whose role in trade was also in decline. Restoration of older buildings rather than construction of new ones was typical of this, the Old Babylonian period. Of the city of Babylon itself at this time little is known: its political supremacy was quite short-lived, control of the marshes at the head

of the Gulf, and thus of access to the lucrative maritime trade, being lost soon after the death of Hammurabi. Meanwhile two groups of newcomers, the Hurrians and Kassites, were becoming prominent in northern and central Mesopotamia respectively, until the latter took over political control in the Mesopotamian plain. Kassite rule lasted over four centuries (c. 1595–1155 BC).

Egypt witnessed its greatest prosperity, military aggrandisement and territorial expansion, both in Asia and in the African hinterland of Nubia, under the New Kingdom, approximately contemporary with Kassite rule in Mesopotamia. With the expulsion of the Hyksos invaders following their occupation of Egypt (c. 1674–1567 BC), the land of Egypt had reverted to the crown. But with the subsequent progressive reversal of this process, imperial expeditions became a necessity. These were abandoned in the reign of the luxury-loving Amenhotep III (c. 1417–1379 BC), when vassal lands in Asia were left to their fate. The ensuing religious innovation, personified by the king Akhenaten and his family and symbolised by the sun disc of his god Aten, was a political move designed to destroy the power of the priests of the orthodox cult of Amun-Ra. After the brief reign of the young king Tutankhamun, far more famous in death than ever he was in life, orthodoxy was restored to the Egyptian court, and with it the military tradition of the earlier New Kingdom. Attempts to regain control of Syria and Palestine were, however, less successful: most of Syria fell under Hittite rule after the indecisive battle of Kadesh (1299 BC), when Ramses II (1304–1237 BC) narrowly escaped disaster. Sixteen years later a treaty between Egypt and Hatti (the Hittite kingdom centred on the Anatolian plateau) established an international peace which was to last a full century. The complex, unsettled political climate of the Amarna period—in the earlier fourteenth century BC, in the reign of Akhenaten—gave way to a tripartite division of power, between Egypt, Hatti and the growing power of Assyria, a kingdom whose origins dated back into the third millennium BC. A fourth power, the kingdom of Mitanni, in the Khabur valley of north-eastern Syria, ruled by an Indo-Aryan dynasty with a class of knights (*maryannu*), lacked naturally defensible frontiers, and inevitably vanished.

The plateau of Iran was overrun from the mid-second millennium BC onwards by Iranian newcomers, most probably arriving from their old homeland in north-eastern Iran and another group perhaps coming via the Caucasus. These were the ancestors of the Medes and Persians of the historical period, and from the beginning may have introduced the essentials of the Zoroastrian religion, now thought to antedate the lifetime of Zoroaster himself.

The end of the established order of the Bronze Age in Anatolia and the Levant, as far as the border of Egypt, came abruptly in the early twelfth century

BC, with the invasion of the 'Sea Peoples'—known principally from the reliefs and inscriptions on the temple of Ramses III at Medinet Habu, Thebes—the Philistines, who occupied much of the fertile coastal plain of the land which has ever since retained their name, Palestine. Many cities then destroyed, including the great mercantile centre of Ugarit on the Syrian coast, were never rebuilt, and the Hittite state vanished.

The resulting vacuum in the power politics of the ancient Near East lasted some three centuries until the rise of the Late Assyrian state. In Syria several great cities rose to prosperity, most notably Carchemish and Hamath, culturally the heirs of Hatti. There was an admixture of influence from the Aramaean groups which had been penetrating the settled lands from the pastoral fringes of the desert zone for some time—at least from the twelfth century BC. To the south the united kingdom of Israel flourished under David and Solomon. After the division of the kingdom, there was a revival of prosperity in the northern kingdom of Israel under Ahab (c. 874–852 BC), and the building of a new capital at Samaria by his father Omri (c. 880 BC). A religious reaction under Jehu led to military and cultural decline.

From the late tenth century BC the Assyrians, whose small but tenacious population was only partly Semitic, re-emerged from the domination of their homeland by Aramaean tribes. Babylon had declined likewise, under pressure from Chaldean tribes. Not until the reign of Ashurnasirpal II (883–859 BC) was there time for major building activity, with the removal of the seals of government up the Tigris, from Ashur to Nimrud (Kalhu). The Assyrian kings showed great energy in scientific and literary pursuits, culminating in the establishment of a library in the final capital at Nineveh. After another period of decline, the throne was seized by Tiglath-Pileser III (745–727 BC), an outstanding campaigner and administrative reformer who transformed the Assyrian territories from a ring of vassal principalities around the homeland in the upper Tigris valley into an efficiently controlled empire under governors appointed by the king: regular taxes replaced tribute. The army came to depend upon regular units backed up by auxiliaries reunited from the conquered peoples. Sennacherib (705–681 BC), who rebuilt Nineveh, curbed Egyptian intrigues in Asia by his campaign against Hezekiah of Judah by laying siege to Jerusalem and Lachish (700 BC) and endeavoured (with limited success) to solve the complexities of Babylonian politics in the face of interference by Elam, the ancient state in south-west Iran. Sennacherib eventually lost patience with the hitherto respected city of Babylon and destroyed it (689 BC)—an act whose repercussions led to his assassination (681 BC). Assyria overreached herself in the short-lived annexation of Egypt by Esarhaddon (681–669 BC). Early in the reign of Ashurbanipal

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(668-627 BC) Egypt reasserted its independence under Dynasty XXVI (663-525 BC), the so-called Saite Period, during which the rulers originated in the city of Sais in the Nile delta. Loss of control of the north-eastern frontier and a costly civil war with Babylon left the way open to the new and formidable coalition of the Medes, and reduced the manpower of the Assyrian army. Babylonia had been too populous ever to be effectively subjugated; and the sack of Susa (c. 640 BC), though for ever eliminating Elam, removed a buffer state. The major cities of Assyria had become artificially extended, supported by the dues paid from the countryside and the conquered lands. Once the machinery of state collapsed, as it did very suddenly in the years leading up to the destruction of Nineveh (612 BC), the cities withered and the countryside was abandoned. Thus Assyria disappeared almost immediately and without trace, bringing an era to an end.

Among the contemporaries of Assyria, the highland kingdom of Urartu, founded in the ninth century BC but with its roots in earlier tribal confederacies, was centred on Van. Urartu reached its zenith in the early eighth century BC; suffered defeats at the hand of Assyria; enjoyed a renaissance in the early seventh century BC under Rusa II (c. 685-645 BC); and survived a few years after the fall of Assyria, ultimately succumbing to the Medes. Phrygia, which attained wide if rather short-lived power under Mita (Midas) in the eighth century BC, had its capital at Gordion in north-western Anatolia. Gordion fell to attack by northern nomads from the plains of southern Russia, the Cimmerians (c. 696 BC), who went on to assault the more westerly kingdom of Lydia and its capital of Sardis (652 BC).

The Phoenician cities of the east Mediterranean seaboard, which lived by trade and industry, survived relatively unscathed until the advent of the heir to the Assyrian empire, the Neo-Babylonian state (c. 626-539 BC). The brief history of the latter was marked by a deliberate cultural archaism, manifested in the restoration of the Sumerian city of Ur: this trend was paralleled at the same time in Egypt, where Saite sculptors looked back to the Old Kingdom for their inspiration. Under Nebuchadnezzar II (605-563 BC) Babylon was rebuilt on a far grander scale than before and economic factors led to westward expansion which led to the destruction of the small kingdom of Judah (587 BC) and of the island city of Tyre (572 BC). Nabonidus, last of the Neo-Babylonian kings, suffered the hatred of the established priesthood of the national god Marduk for his devotion to the moon god Sin and contributed to the ease with which Cyrus the Persian occupied Babylon (539 BC).

The defeat by Cyrus king of the Persians of the king of the Medes (his own grandfather, Astyages) marked the foundation of the Persian empire, called Achaemenid after the ancestor of the royal house (550 BC). The westward expansion of the empire was

secured by the defeat of Croesus, the king of Lydia, and the capture of Sardis (546 BC). Babylon fell without resistance, and with it the Babylonian possessions in the Levant. Eastward expansion proved harder, however, and Cyrus died in battle beyond the River Oxus. Preparations for the conquest of Egypt had to be carried through by Cambyses II (525 BC). It seems that the impression produced by the buildings of Memphis and Thebes, perhaps even more than the sight of the Greek cities of the Ionian coast, popularised columnar architecture among the Persians. After the civil war Darius I (522-486 BC) built the network of arterial roads and reorganised the empire into satrapies or provinces, twenty in all, each under a satrap or governor. The Persian empire, the widest in the ancient world, then extended from the Danube to the Indus. Persian rule was not harsh; the customs and cults of the conquered peoples were respected. The first serious reverses were suffered in efforts to conquer Greece, which met with final failure under Xerxes at the battles of Salamis and Plataea, on sea and land respectively (480-479 BC). Persian gold was later more effective in manipulating the rival Greek cities.

After the rise of Macedon under Philip and his subjugation of the Greek cities, the way lay open to his son Alexander the Great (336-323 BC) to carry the war into Asia, where his name is still remembered. The empire founded by Cyrus the Great thus fell into Alexander's hands and Greek civilisation began to spread its influence even to Bactria (Afghanistan) and the Indus valley.

While Egypt fell to the Ptolemies with the partition of the vast empire after Alexander's death in Babylon (323 BC), the gods and temples of Egypt were lavishly endowed, with new temples built to the traditional design. The centre of Greek culture was the new city of Alexandria. But the greater part of Alexander's empire was under the Seleucid dynasty, including Iran (312-247 BC), which later passed successively under the Parthian (247 BC-AD 226) and Sassanian (AD 226-561) dynasties, and was finally conquered by the armies of Islam. From the first century BC onwards the Mediterranean lands of the Near East, as well as Anatolia as far as the upper Euphrates, came by stages under the grip of Rome.

Greece and the Greek Empire

The civilisation of Greece and the Aegean can be divided, broadly, into the prehistoric, of the second millennium BC and earlier, and the historical or Classical, which emerged after a period of poverty and retrogression around 1000 BC. At neither period is the area a political or historical unity. The earliest phases are certainly pre-Greek, that is, the people of

these times spoke languages which are not Greek in form. The most important early phase centres on the island of Crete; its discovery is the work of modern archaeologists, in particular the excavator of Knossos, Sir Arthur Evans, who gave this civilisation the conventional name of Minoan (after Minos, who in Greek legend was King at Knossos). It is divided, in accordance with the development of pottery styles, into Early Minoan (roughly third millennium BC), Middle (early second millennium) and Late (the second half of the second millennium); more significant, perhaps, is the architectural division into pre-palatial, down to the early second millennium, and palatial, characterised by architecturally complex administrative centres ('palaces'), again typified by that at Knossos (p.97) and influenced by east Mediterranean political concepts, though it must be emphasised that the development of architectural forms is local and continuous, from pre-palatial to palatial. The palatial period was literate, using, at least for record purposes, a linear syllabic script, of which there are two versions, the earlier (Linear A), being used for the (undeciphered) Cretan language, the later (Linear B) for an early form of Greek.

The palaces of Bronze Age Crete were more than the residences of the rulers. Besides the recognisable domestic quarters they included on their ground floors substantial areas for storage, as well as work rooms. Later Greek tradition had a memory of King Minos's fleet controlling the Aegean (much in the way that in historical times the Athenian fleet dominated the seas) but this may be something of an anachronism or distortion; overseas contacts seem to be much more a matter of trade than of empire, and there is no evidence for executive Minoan domination of the mainland. There is little evidence for the social and political structure, beyond the undoubted hierarchic and presumably autocratic element. Each palace (the size varies from large to small, depending on the size of the community) must have represented a separate centre of administration; whether the smaller were in any way subordinate to the larger, or, in the late Minoan period at least, to the largest of them all, at Knossos, is quite uncertain. The general impression is of peacefulness. There are no fortifications of any note, and the prosperity of the palace communities is demonstrated by their size, and the luxuriousness of building construction and appurtenances. Smaller but still substantial houses or villas suggest the extension of wealth through the urban community, at least. Women are frequently depicted in the art of the palaces, participating in or observing the religious rituals. Representation of priestesses is frequent, but, again, it is difficult to build a secure interpretation of the general status of women from this, and the existence of an exploited rural population may lurk behind the brilliance of the palace forms.

Around 1400 BC the Cretans were overcome by

people from the mainland. The archaeology of mainland communities is distinctive, though linked to that of Crete and the islands; the modern, conventional term used to describe it is Helladic. The early Bronze Age is probably pre-Greek, Greek settlers arriving towards the end of the third millennium BC (there were still areas where pre-Greek languages were spoken even in the historical period, and these have left their traces in the place-names, many of which, such as Athens or Corinth, have no sensible meaning in Greek). Early Bronze Age settlements are small, though few have been excavated, and the important ones were in places where extensive subsequent occupation makes the recovery of the early settlements plans difficult. There are distinct signs of chaos and disintegration towards the end of the early Bronze Age, which may be coincidental with the arrival of Greek-speaking peoples.

The mainland developed particularly in the Late Bronze Age. The major settlements are characterised by the possession of citadels, more and more strongly fortified, and enclosing palaces clearly influenced by those of Crete, but not Cretan in plan and arrangement (p.99A).

The social organisation of the mainland communities seems to have followed that of Crete; there is clear evidence for a ruling class, the kings, who were buried in particularly sumptuous tombs, with wealthy grave goods, much more lavish than the forms of burial found in Crete. They were an aggressive people, extending their influence in the Aegean more by raiding, plundering and, eventually, subjugation, than by trade. Late Bronze Age pottery of the mainland is finely made, and is found widely distributed through the Mediterranean, indicating that the mainland Greeks took over the trade which previously had been centred on the Minoan palaces. It was probably at mainland-occupied Knossos that the Linear A syllabary was adapted (Linear B) to the writing of Greek; Linear B tablets (but not Linear A) have been found on the mainland.

Around 1200 BC this flourishing civilisation entered into a period of severe decline. During this Dark Age, Greece underwent some depopulation, whole groups of people moving across or even out of the Aegean altogether, either as sea-raiders or settlers. In turn, other Greeks from the mountains and from less prosperous northern regions took advantage of weakness and depopulation in the south to migrate to these more fertile regions. These Dark Age movements formed the basis for the principal dialect divisions of Greek. Central Peloponnese (Arcadia) was unscathed by these movements, and continued the form of Greek spoken in the Bronze Age; but another branch of the same dialect is found in Cyprus, indicating a common origin for peoples completely separate in the historical period. The northern migrants brought with them the dialect known as Dorian, spoken in Messenia, Laconia, the

Argolid, Corinthia and adjacent areas as well as Crete and Rhodes. Migrants to the eastern Aegean spoke Ionian Greek, which, in a variant form, survived on the mainland as the Athenian dialect. Other forms of northern Greek (Aeolic) were spoken on the mainland north of Athens, and in the northern parts of the Asia Minor coast. These dialect terms are also equated with the principal geographical divisions, and so (Ionic, Doric, Aeolic) with the characteristic architectural forms which evolved in them. It is important to note that these geographical and architectural divisions did not precisely coincide with the dialect divisions. Doric, for example, is the essential style of the entire mainland, even Athens.

The revival of the Greek world was fitful. Poverty was exacerbated by virtual isolation from the rest of the Mediterranean world. Some communities, such as Athens, flourished earlier than others, but the real revival did not begin until the eighth century BC, when there is evidence of the renewal of overseas trading contacts. Not all Greek communities traded, but those that did grew richer, and, by amalgamating forcibly or voluntarily with their neighbours, formed larger states, the polis (city-state) being the natural and desirable political entity in the ensuing Classical period. Early examples are Athens, Corinth, Argos and Sparta, on the Greek mainland, while in the eastern Aegean Samos, Chios, Smyrna, Ephesus and Miletus also grew (the last three, being on the mainland of Asia Minor rather than islands, were not confined, and came to control extended regions inhabited largely by people of non-Greek origin). During this period, the 'Archaic', which extended from the eighth to the sixth century BC, Greek artists broke away from the abstract, geometric forms which had been inherited from the Late Bronze Age, and introduced oriental motifs, decorative patterns and representations of animals and human beings which were all parts of the common repertoire in the Levant communities. The Levantine origin of what is termed the 'orientalising' phase of Greek art is emphasised by the development of the new, alphabetic system of writing adapted from the Phoenician script, Linear B having disappeared during the Dark Age except in a modified form in Cyprus.

Each city-state was jealous of its autonomy and independence. Even so the Greeks were conscious of a degree of unity, fostered by a unity of language which was recognised above the variant dialect forms, and particularly by shared religious concepts, belief in the same gods who thus acquired both local (city) and universal (Greek) significance. Politically, this archaic phase of Classical Greece was dominated by the leading aristocratic families in each city, either acting in concert or squabbling amongst themselves for supremacy. At times individual aristocrats, taking advantage of popular dissatisfaction, and putting themselves forward as leaders, managed to seize authoritarian power. Such rulers were called tyrants,

from a borrowed (Asiatic) word meaning king. Their regimes were, at this time, usually beneficent; only later, as their power was challenged, did they become harsher and thus warrant the change in the meaning of the word. The arts were most greatly stimulated by aristocratic or tyrant patronage. The movement of Greeks to colonies overseas (Italy, Sicily, North Africa, the Black Sea), for the encouragement of trade and to relieve pressure of population, was caused as much by readjustment of the economy in favour of the ruling families, as by natural population growth.

This development was challenged by the rise of major states in the east. Asia Minor passed to the dynasty of Gyges and his successors, who were based on Sardis in Lydia. This dominion seems not to have been oppressive and the Greeks benefited from the support of the Lydian kings, particularly the last of them, Croesus, whose financial contributions made possible the grandiose temple of Artemis at Ephesus. In 546 BC, however, the Lydian kingdom was overwhelmed by the rising power of Persia which rapidly extended to include the whole of the Near East and Egypt, as well as the Iranian plateau. Some Greek cities came under immediate Persian control (those on the mainland of Asia Minor); the offshore islands were conquered later. Persian authority extended into the Balkans, and a rebellion of the Ionian Greeks, though supported by Athens, failed. Miletus was destroyed, together with the temple of Apollo at Didyma; the free Greek cities saw the threat that was developing, and prepared for resistance. A seaborne expedition to Athens, where the Persians hoped to install a co-operative tyrant, was heroically defeated at Marathon in 490 BC; the subsequent death of the Persian king, Darius, and the rebellion of Egypt put off the expected retribution until 480 BC, when the invasion was led by the new Persian king Xerxes. By now the Greeks were ready. Sinking their differences, they formed a grand alliance under the leadership of aristocratic Sparta. Athens, which had developed a truly democratic constitution late in the sixth century, built a large fleet, and the Persian invasion was comprehensively repulsed in 479 BC. The alliance had to be maintained, however, if the Persian empire were not to pick off the Greek cities piecemeal; Sparta had turned her back on naval activity, which gave political muscle to the poorer sections of the population, and the Greeks of the Aegean turned to Athens for leadership. Gradually the alliance was transformed into an empire, though the Persians were successfully kept at bay, and the Athenians, under the leadership of Pericles, felt justified in turning the defence revenue into temples as thank-offerings to the gods for victory. Athens thus reached the height of her power and prosperity, but all this was thrown away in a senseless war with Sparta, which dragged on fitfully until Athens lost her fleet and was starved into submission. The struggle was essentially between the democratic, revolu-

Tyrant?

tionary spirit of Athens, supreme in the arts of peace but unfitted for the control of a major war, and aristocratic, reactionary Sparta, less brilliant in the arts and architecture, but militarily far more successful.

Greece gradually slipped into political chaos, so that the weakened Persian empire was able to dictate terms, and this was accompanied by a marked, though not catastrophic, economic decline. Sculpture still flourished, particularly at Athens, but less money was now available for building. Few temples were built (though of course most important sanctuaries were now well enough endowed with temples), but there was some development in the construction of buildings for more ordinary human use. There was some revival of architecture at Athens at about the middle of the fourth century BC, which may indicate the existence of Persian support. If so, it was aimed at countering the new rising power of Macedon in the north. This had been a backward and largely negligible border state in the fifth century, and in the early fourth was no less chaotic than the rest of Greece. The transformation of Macedon was due largely to the efforts of one man, Philip, who became king on the death of his brother in 359 BC. Relying on the fighting skills of the Macedonians, coupled with his own brilliance as soldier and diplomat, he rapidly extended Macedonian power and wealth, until at the battle of Chaeronea in 338 BC he defeated a coalition of the major Greek cities, Athens and Thebes, and created a new federation of all the Greeks, theoretically free, but in practice controlled by Philip as its appointed leader. To achieve a unity of purpose he proclaimed a crusade against the Persians, originally proposed many years previously by Isocrates; and though he was assassinated before he could do more than make the preliminary moves, his son and heir, Alexander, carried through the crusade with complete success and established himself as the ruler of the former Persian empire.

Alexander's short life was almost entirely taken up with campaigns, and at his death in 323 BC he had not achieved the permanent organisation of his empire or made proper provision for the succession. In default of an effective heir, the empire was divided amongst the Macedonian generals, who carved out of it separate kingdoms for themselves. Those of Ptolemy in Egypt and of Seleucus in the Near East were the more important and durable. Macedon passed to a new dynasty, that of Antigonos. The Greek cities established their freedom for the Achaean and Aetolian confederations. Asia Minor reverted to its traditional pattern of local dynasts, those of Pergamum making an especial contribution to the architecture of the period.

During this period, the Hellenistic age, Greek forms of art and civic life were transplanted into the newly conquered areas, though always subordinated

to the control and policies of the ruling kings. Greeks migrated to the cities founded in the new territories, of which the most important and durable were Alexandria-by-Egypt, founded by Alexander, and Antioch in Syria, founded by Seleucus. These attained levels of wealth unprecedented in earlier, Classical Greece. There was considerable expenditure on ephemeral show (particularly religious processions), but the arts and architecture also flourished. Although the concept of Graeco-Macedonian supremacy (which grew weaker as a result of bickering between the kingdoms during the third century BC) ensured the introduction of Greek architectural concepts in the new cities, and prevented the direct and wholesale copying of local art and architecture by the Greeks, the majority of the population in these kingdoms was not Greek but, for example, Egyptian or Syrian, and for them the old styles and tastes and religious beliefs continued. Influences between groups are discernible; as far as the Greeks were concerned, this was largely a matter of taste or fashion rather than deliberate adoption of the local forms, but there can be no doubt that this had some modifying effect on the architecture. In the end, the eastern areas, the Iranian plateau and most of Mesopotamia were lost to the reurgent oriental kingdom of the Parthians. Egypt, Syria and Hellenistic Asia Minor were rescued by the Romans, who gradually took over responsibility for them, receiving Pergamum by the bequest of its ruler Attalus III in 133 BC, and, finally, Egypt on the death of Cleopatra VII in 30 BC.

Culture

Egypt and the Ancient Near East

Sickles, querns, mortars, pestles, pounders and other ground stone tools have been found in abundance at Natufian sites in the Near East. Vessels made of limestone and marble have been recovered but there is no evidence of pottery. Carved figurines of animals and women occur at many sites, and cave paintings of the period have been found. Burials were in simple graves set in the floors of houses. Grave goods were infrequent and took the form of decorative objects. At some sites, cemeteries suggested more protracted periods of habitation.

In the Neolithic period, stone tools, mainly flint, were supplemented by artefacts made of bone. Art took the form of decoration on beads, carved animal heads on knife handles and stone carvings. Small ornaments were produced in turquoise, marble and alabaster. Burials were frequently under floors, but hoards of human skulls have been recovered with faces modelled in plaster and eyes indicated by shells.

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Pottery was produced widely from about 6500 BC. It appears to have had multiple places of origin, and the technique spread rapidly throughout south-west Asia. The first sophisticated and uniform pottery styles appeared about 5500 BC with Samarran and Halafian wares. Pots were hand made, fired at high temperatures and decorated in polychrome geometric designs. The pottery Neolithic period in Anatolia was marked by a richness in material goods, and developments in the sphere of art and religion: shrine-rooms were decorated with paintings and reliefs representing women and the heads and horns of bulls. The numbers and size of these rooms are suggestive of domestic rituals. The Ubaid period produced both hand-made and wheel-turned pots, and copper tools supplemented the older lithic technology. The growing importance of religious practices was indicated by developments in building temples, some of the facades of which were decorated with friezes. One of these depicted dairying scenes.

Some of the most striking products of the material culture of the Neolithic Age in predynastic Egypt are the rock paintings and engravings at Tassili in the Sahara Desert. Faiyumi sites have yielded flint and bone tools, coarse pottery and a variety of woven artefacts including textiles, mats and baskets. Merimdan sites differed only in that the dead were buried among the dwellings. The Badarians made advances in stoneworking, and produced articles of personal adornment including stone beads, necklaces, girdles and cosmetics. Copper appeared in the form of beads. Thin-walled, burnished pottery was produced by the Badarians, and the Amratians made a red, burnished ware, line-decorated with white slip. Stone vases, a characteristic product of ancient Egypt, date from this period. Gerzean pottery developed from Amratian ware. A greater range of vessel types was produced, and decorative motifs included stylised animals, humans, and scenes from everyday life, as well as geometric designs. Faience was produced, copper came into widespread use, and hieroglyphic writing also dates from this period. It is possible that mud-brick architecture was introduced at this time from abroad. Burial in cemetery sites became more elaborate, with an increasing differentiation of the structure and contents of graves, pointing to an increasing emphasis on the after-life.

Religion is more clearly reflected in the architecture of the ancient Near East than social structure and development, if only because of the disproportionate ratio of religious to secular buildings among those excavated. In the Neolithic period the cellular layout of houses and shrines at Catal Hüyük, on the Anatolian plateau, may reflect the growth of extended families; but not enough of the site has been uncovered for definitive conclusions to be drawn.

From around 5000 BC the temple, first discernible at Eridu, emerged as the outward and visible sign of the cohesion of the Sumerian city, of its control by a

ruling élite and of its growing attachment to cultural traditions. This conservatism was reinforced by the introduction of writing, making it possible to refer back to precedents. The Mesopotamian temple, at first relatively accessible to the populace, as time passed, seems to have become more a palace for the sovereign protector of the city, than the house of the patron god or goddess. As the secular influence of the temple declined (partly as the result of growing literacy in the mercantile class), access to the temples was more and more restricted to the priesthood.

In Egypt the close connection between religion and architecture is everywhere manifest; the priesthood was powerful and equipped with all the learning of the age. Egyptian religious rights were mysterious and virtually unchangeable, characteristics reflected faithfully in the architecture of tombs and temples. Egyptian mythology was in effect polytheistic and complicated by the multiplicity of local gods in different places. The royal cult was essentially that of the sun, while the worship of Osiris, god of death and resurrection to eternal life, became ever more popular as the centuries passed. Elaborate preparations were made for the preservation of the body after death. The earthly dwelling-house was regarded as the temporary lodging and the tomb as the permanent abode; hence the enduring pyramid tombs of the Old Kingdom and the description of the duration of the royal rock-cut tombs of the kings west of Thebes, in the New Kingdom, as 'of millions of years'. The kings of Egypt were both gods and priests, while the gods themselves were invested with superhuman and therefore with inventive powers, as when the art of writing was regarded as the invention of the god Thoth. The gods were often associated in triads: thus Amun the sun-god, Mut his wife, the mother of all things, and Khons their son, the moon-god, were the great triad of Thebes; while Ptah, a creator and craftsman, Sekhmet, goddess of war, and Nefertum, their son, formed the triad of Memphis. These and many hundreds more divinities occur singly or in combination. Much was added to the religion of Egypt: nothing was ever taken away.

Spatial analysis, in the sense of detection of an overall layout of buildings in relation one to another, is seldom possible in the ancient Near East, for one of two reasons. Either the city grew over successive generations or excavations do not reveal the whole layout. On the whole the dominant tradition in the architecture of the Near East was that of the inward-looking plan, with rooms opening off one or more courtyards, allowing for light and air, but likewise privacy and security: this applied to palaces and town houses alike, especially in Mesopotamia. But a very different tradition becomes evident at Pasargadae, the earliest Achaemenid Persian royal residence, where buildings were dotted about the highland plain like the scattered tents of a great army.

Religion reflected the peculiarities of each zone of

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the Near East, perhaps being least dominant in the commercial and industrial ethos of the Phoenician homeland and colonies, though the old Canaanite cults survived and were exported to Carthage, from its traditional foundation date (814 BC). The clashes between the austere religion of Yahveh, with its desert background, and the priests of Ba'al are familiar from the Old Testament. Priest and prophet were uneasy partners: both Zadok the priest and Nathan the prophet officiated at Solomon's coronation. It is the priestly legacy which is more relevant to the history of art and architecture, however, than the prophetic.

The Hittite kings, as chief priests, spent much of their time in peregrinations from one shrine or sacred city to the next. The origins of their status lay in their Indo-European ancestry; but contact with the older civilisations of the Near East in the last two centuries of the Hittite kingdom brought its kingship more closely in line with oriental charisma. The Hittite king became 'The Sun', the winged sun disc of Egyptian origin hovering over his head.

In his famous rock inscription of Bisitun (Behistun), Darius the Great emphasised his adherence to a simple ethical code, to cling to the Truth and to abjure the Lie, and to be a good horseman. Whether or not Darius was an adherent, the religion of Zoroaster, as well as the associated cult of fire, had its beginnings well back in early Iranian history.

Greece and the Greek Empire

The ritual of prehistoric religion in Greece cannot be properly reconstructed on the archaeological evidence, and modern interpretations are inevitably controversial. In Crete there was a contrast between ritual in the palaces, which included processions and bull-leaping in the courtyards, and ritual in the rural shrines, on mountain tops and, above all, associated with sacred caves. Figurines have been identified as goddesses, while representations of bulls and bull-leaping, together with later Greek legends of the Minotaur, emphasise the place that animals had in Cretan cults.

On the mainland, shrines and cult rooms have been identified at Mycenae, Tiryns and elsewhere. Small shrines outside the palace areas, and often in the vicinity of the gates, suggest a protecting role. It is quite uncertain whether or not, amongst the main rooms of the palace, the *megaron* and its hearth served a religious function (despite the superficial similarity in plan to the later temples of the Classical period).

In Classical Greece, the polis, the city-state community, was of paramount importance and the individual was subordinated to it. Maintenance of the community depended on the maintenance of the families, the households (*oikoi*). All aspects of life

were under the protection of the gods, who were regarded as all-powerful, but similar to ordinary humans in their passions, desires and appetites. The origins of Greek religion are lost in the remoteness of prehistory, though it is clear that there is no single line of development. Despite hostility toward innovation, religious belief was constantly changing and developing, reflecting changes in human circumstances. New cults were introduced from time to time, so long as they did not challenge the essential polytheistic, anthropomorphic nature of religious belief, while existing cults developed or changed their emphasis in response to human needs.

The essential concept in religious practice was that of contract, of obligation and the paying of obligations. Humans—primarily as a community—called on the gods for protection, and made offerings to the gods to secure this. Foremost was the regular ritual of sacrifice, the offering of food, and religious practice centred on this. Sacrifices took place throughout the year, but there was always one principal annual ceremony or festival for each god in every community, in the sanctuary set aside for that cult. The offering included animals, which were brought to the sanctuary and slaughtered. Those parts—generally the less edible—offered to the god were burned on an altar; the remaining meat was cooked, rather than burned, and distributed to human worshippers, who consumed it in the sanctuary (there was frequently a prohibition on the removal of sacrificial meat from the sanctuary). Other offerings comprised durable objects, essentially those whose acquisition was desirable in ordinary life. Statues commemorating periods of service to the gods, as priest or priestess, might be set up; not only did they commemorate former service, but continued it, the statue constituting a perpetual servant. The sanctuary was the estate of the god: he required a house where he might live and keep his belongings safe.

Thus a Greek sanctuary comprised essentially an open space, marked off as the god's property but not necessarily closed off from the outside world by a physical barrier. There was an entrance, so that one knew the point at which one left the mundane world and entered the god's property. There had to be enough space to accommodate the worshippers at the festival. Some cults had limited support, but the chief protecting deities of the city-state might attract the entire population, so large sanctuaries were needed. Cult focused on the open-air altar, at which the sacrifice was made. This was the only real essential. The god was represented in the sanctuary by an image (which by the Classical period generally meant a realistic, representational statue); this might be wooden (the earliest images seem to have been invariably of wood) or of stone or bronze, while the most expensive were made from plaques of gold and ivory attached to a wooden frame. Some shelter was necessary, particularly for wooden and gold and ivory

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images. Whether this reached a level of architectural interest depended on various factors—the importance of the cult, the availability of funds in the worshipping community and so forth. Buildings were themselves offerings, and there was therefore pressure on the worshipping community to provide them, as magnificently executed and decorated as possible, in order to please the god. It was this that led to the building of temples, rather than any functional purpose as congregational buildings. The earliest sanctuaries had none—they were merely places for festival and sacrifice, and even the altar need be no more than the pile of ashes left by former sacrifice. In the Dark Age, shrine or temple buildings were virtually non-existent (there is one temple-like building at Lefkandi on the island of Euboea, of about 1000 BC, but this is an embellishment of a grave, not a structure, it would seem, dedicated to a god). Otherwise the building of temples is first securely attested in the eighth century BC, at the period when east Mediterranean influences were making themselves felt on Greek society and its artistic achievement.

Other categories of building responded to the particular conventions of Greek society. Political systems depended on gatherings. This idea developed at village level, and a place had to be provided where the citizen body might be gathered together, if necessary, to make the vital decisions on war and peace. The gathering place might be a field outside, but with the growth of organised towns, the central gathering place or agora was an essential element in the town plan (and had to be large enough to accommodate, in theory at least, all the adult male population). The agora was essentially a space, not a building, though the structures required for the functioning of the polis might be placed at its edge. Such buildings did not have to be as magnificent as the temples, or as solidly constructed. In the wealthier cities stone buildings were put up, but even Athens in the fifth century constructed buildings of unbaked mud brick in its agora.

Public life was for the male citizens. Women lived a more secluded life, mostly in the privacy of the home (though they attended the religious festivals). If anything, restrictions on their lives seem to have become more severe in the historical period, and the forms of domestic architecture reflect this. Houses turned their backs on the outside world, looking inward to the enclosed courtyard. Even inside the house, there was a division between the men's room (andron) where male guests participated in dinner and drinking parties, and the women's quarters, to which the female members of the family were banished on these occasions.

These circumstances created the essential architectural principles which are discernible in the arrangements of a Classical Greek city. The first, the temple principle, is that the simple rectangular, roofed structure—in essence an embellished and improved hut—

was built as an offering to the god and was designed to be admired from outside. Its architectural interest is therefore concentrated on the exterior. The second is that of building around a space or courtyard—an architectural effect which can be appreciated only from within the court. The enclosing structures need not be continuous—a series of separate buildings, perhaps—but very often they were given porticoes on the side that faced the court, the tendency being to run porticoes or colonnades continuously along each side of the court, with only occasional gaps or, eventually, with no gaps at all. These enclosed, colonnaded courts are a particular feature of Hellenistic cities.

Resources

Egypt and the Ancient Near East

Only truly local materials were available for building purposes in the Near East, including Egypt, from prehistoric times until the stage (at varying dates in each region) when the necessary political advances had occurred so that long-distance trade and the extraction of resources became possible. The labour for construction must be assumed to have been local except for documented instances when foreign craftsmen are known to have been brought in to execute the work.

In the alluvial plains of the Tigris and Euphrates stone and timber suitable for building were rare or unobtainable unless imported. There was, however, a plentiful supply of soil which, mixed with water into mud, poured into moulds and either sun-dried or kiln-fired, provided bricks for every kind of structure. Kiln-fired bricks were used only for drains, pavements and the facing of certain major buildings, such as the ziggurat at Ur; it was not until the Neo-Babylonian period, in the sixth century BC, that kiln-fired brick became the standard building material in Mesopotamia. The Assyrian kings were much concerned to receive reports of the harvest, partly because of its direct effect on the royal building programme for the coming year, since without enough straw to mix with the mud, bricks could not be made, as the Hebrews pointed out in their well-known complaint to Pharaoh. The Assyrians were masters of the art of deploying large labour forces to build new palaces, temples and defensive walls or to repair old ones: it has been estimated that mud bricks could be laid at the rate of one hundred per man per day. Mud brick is the most important of ancient Near Eastern building materials, because of its ubiquity. Many sites in the highland zone might seem to have been built only of stone but excavation often reveals remains of mud-brick superstructure above the masonry, as in the Urartian fortresses. The precise measurements of mud bricks tended to become stan-

AGORA

DIWANA

HAVELI

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much
about

standardised for each region in a given period, the limit on size being the weight readily handled by one man, as is still the case today.

Reeds, papyrus (a plant now almost extinct) and palm-branch ribs, plastered over with clay, were tractable materials readily available in the Nile valley, where they were used in the buildings of pre-dynastic Egypt. A roughly comparable tradition flourished in Mesopotamia, particularly in the Sumerian south, where it is perpetuated to this day by the Marsh Arabs, who construct large halls of reeds and live on low platforms very close to water level, much as depicted in the palace at Nineveh in reliefs of Sennacherib's largely abortive campaigns into the marshes near the head of the Gulf. Reed matting was used between mud-brick courses as reinforcement in Mesopotamia and Egypt alike.

One material available in Mesopotamia and the neighbouring plain of Susa (in due course the heart of the kingdom of Elam) was bitumen, which was obtainable from natural springs. It was first used in Neolithic times as a mastic, especially for setting flint sickle-blades into hafts of bone. Eventually its waterproofing qualities were realised, and it was employed for lining drains and to reduce the erosion of mud-brick walls.

In Egypt abundant labour was available for the transportation of stone blocks from quarry to building site, by raft on the Nile and laboriously up ramps from the river bank, especially in the summer season of the annual inundation, without resort to slavery.

Egypt shared with Mesopotamia a lack of timber for major building work, though the date palm could be used for houses, largely for roofing. From the earliest dynasties the Egyptian kings imported cedar-wood by ship from Byblos, the ancient port just north of Beirut, for building purposes, coffins and some ship-building, though papyrus was the local material. The cedar forests of the Lebanon mountains were thus exploited for the Egyptian market, while the rulers of Mesopotamia from the middle of the third millennium BC onwards obtained their cedar from the Amanus range, close to the north-east corner of the Mediterranean. The Assyrian kings listed with pride and in considerable detail the materials used for the construction, embellishment and furnishing of their palaces and temples: cedar and fir were favoured for roof beams and doors. Cedar was used by Darius the Great and his successors in roofing the columned halls of Parsa (Persepolis).

Foreign peoples might be employed, more or less forcibly, by an imperial power for the construction of great public buildings, especially since Near Eastern kings were always anxious to complete their temples or tombs in their own lifetime. The Assyrian king Sennacherib recounts his removal of over 200,000 people from Judah: the fate of such deportees is vividly portrayed at Nineveh in the relief showing workmen toiling up the steep side of the foundation

platform of the new Palace With a heavy, to empty their baskets of earth and rubble, watched over by the royal guard. A clay tablet found in a palace of Darius at Susa mentions masons from Ionia and Sardis and woodworkers also from Sardis, making inlays; the Babylonians were still the most skilled workers in mud brick. Cambyes is said to have deported many craftsmen from Egypt.

Greece and the Greek Empire

The Greek world in general has abundant sources of high quality building stone, particularly limestone and marble, which can be quarried without undue difficulty. There are good sources of clay. In much of the Greek mainland timber is by comparison scarce or stunted in growth. The characteristic trees are pine and cypress; substantial hardwoods are not available. There is thus a severe restriction on building imposed by the difficulty of roofing wide spaces. The greatest width that can be spanned without intermediate support is about 10 m (33 ft); only the most important buildings, for which timber could be imported, such as the Parthenon, exceed this, and even then only by one or two metres. The shortage of timber for firing meant also that bricks were of unbaked clay: fired terracotta was employed only for tiles (which might also be made of marble on important buildings) and the decorative revetments.

The volcanic activity in the Aegean (Santorini), Sicily (Etna), and southern Italy (Vesuvius) indicates the presence of metamorphic rocks; the other contributory geological factor is that of sedimentary deposition. Thus, much of Greece is hard limestone or marble, in various forms, though there are other areas (noticeably Olympia) where the rock is a poor quality conglomerate. In general it was the hard limestones and marbles which were exploited for building purposes, and created the distinctive appearance of Greek architecture. There are many types of marble, generally variegated and often coloured. Coloured marble was used for the architecture of the mainland in the prehistoric period, and was again much appreciated by Roman architects, by whom it was exported over a wide area; Classical Greek architecture preferred, almost exclusively, the white marbles, that of the islands of Paros and Naxos being first exploited in the seventh and sixth centuries BC for both architecture and sculpture. (As the quarries are close to the sea it was easily transported to other parts of Greece.) In the fifth century BC the Athenians developed the quarries of Mount Pentelikos (Pentelic marble). There are numerous other sources of white marble, especially in Asia Minor.

Proconesian marble from the Propontis (Sea of Marmara) was exported widely, other types tended to be used more in their immediate locality. Gypsum was quarried in Crete and used, in the form of saw-

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cut blocks, for walls in the buildings of the prehistoric period.

The western Greek communities in Sicily and Italy, and those in Cyrenaica, did not have marble, and their architecture is invariably created in limestone; even in Aegean Greece limestone is more commonly used than marble, particularly for the more mundane structures. Limestone was also burnt to provide mortar, though in most parts of Greece the relative shortage of timber made this an expensive process, and its use was limited to providing a fine finish (mixed with marble dust) for limestone buildings of importance. It was used also as a hydraulic cement, for submerged works and industrial structures. There are good sources of clay which were exploited for unbaked brick, and for terracotta for tiles and decorative revetments.

Skilled architects and craftsmen were in demand, and frequently travelled from state to state. Systems of employment and methods of payment in the early period are uncertain; coined money was not developed until the sixth century BC, but by the fifth century there are records giving the wages or piece-work rates for builders. Financial resources thus became an important factor in building, whether provided by the state, the sanctuaries themselves, or private individuals. Architects and craftsmen usually were free men, though not necessarily citizens of the community in which they undertook work. Slave labour was employed and there is evidence in the building records of the Erechtheion at Athens of payments to slave owners for the work done. It is wrong to give this undue emphasis and there is no evidence for the *corvée*, or forced labour, in Classical Greek building, though it may have been used in the prehistoric period.

An important factor in Greek building was the part played by the financial guarantor, who came between the employer (the state, or religious officials) and the builder. This role was regarded as a duty to be undertaken on behalf of the community by its wealthy members. It was their responsibility to see that the work contracted for in all aspects of building, from the quarrying and gathering of material to the finishing touches, was properly carried out; the guarantor, not the contractor or craftsmen, paid any penalty for inadequate work.

Building Techniques and Processes

Egypt and the Ancient Near East

The Natufians used simple drystone techniques to a limited extent, but building was predominantly in mud brick. After careful selection and preparation of the clay, the main bricks were formed by hand or occasionally moulded and then sun-dried; alternatively

the clay was used as a plastic material by building up wet mud in courses and allowing each to dry before adding the next. Fixed features such as storage bins, platforms, hearths and seats were modelled *in situ*. Occasionally the mud was mixed with straw, and foundations were sometimes of stone to ensure that the building did not stand on a wet base. Roofs were generally flat, and made of timber beams covered with matting plastered with clay. Thatched roofs were used sometimes and walls buttressed to support the roof timbers. Doorways were lined with timber reveals and thresholds. Plastered floors and walls were common. Mud or lime plaster was finished in a variety of ways including painting, burnishing or setting with terrazzo.

Egypt made the transition from insubstantial vegetable materials like reeds, papyrus, palm fronds and matting to the tectonic forms of mud brick and stone in Late Gerzean times, possibly influenced by contact with Mesopotamia. Timber and matting linings were used in grave construction.

In each region techniques and processes developed through a blend of local resources. Care was often lavished more on decoration and finish than on structure: this is especially true of Egypt, where metalurgy lagged behind that of Asia—bronze did not appear until the Middle Kingdom. In a sense, Egypt also lagged behind in building technology. For example, although in the roughly finished stone-work of the Royal Cemetery at Ur the true arch and vault appeared, they seem to have been unknown to the stonemasons of Egypt of the same period. However, there is no denying the superior stone-dressing and sheer mass of the contemporary pyramids of Gizeh.

In predynastic Egypt there is evidence that bundles of reeds were set vertically side by side and lashed to bundles placed horizontally near the top, to make walls or fences. Alternatively, palm-leaf ribs were planted in the ground at short intervals, with others laced in a diagonal network across them and secured to a horizontal member near the top, the whole being finally daubed with mud. The pressure of flat reed-and-mud roofs against the tops of the wall reeds may have produced the characteristic Egyptian 'gorge' cornice, while the 'kheker' cresting less frequently appearing in later architecture may have originated in the terminal tufts of a papyrus-stalk wall (p.36B). The horizontal binders and angle bundles survived in the roll moulding of stone cornices and wall angles of the historical period (p.36J).

Dearth of pictorial representations as much as meagreness of archaeological evidence in the form of building remains makes it harder to describe with any certainty the earliest building techniques of the Near East outside Egypt. The round houses of Pre-Pottery 'Neolithic A' Jericho, three millennia older than the earliest village remains in the Nile valley, doubtless had flimsy domical roofs. At Catal Hüyük a typical Near Eastern conservatism is in evidence. The origin-

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al purely timber construction survived in the timber-frame houses and shrines revealed by the excavations, and only in the latest levels was it supplanted by construction entirely in mud brick.

The essentially arcuated architecture of Mesopotamia was the outcome of the constraints imposed by the structural demands of brick vaulting. Rooms had to be narrow in relation to their length, with massively thick walls: a similar constraint applied in the Assyrian palaces as a result of the use of cedar beams for roof-construction. The true arch with radiating voussoirs was known by the third millennium BC.

For want of stone of the right quality and size, free-standing columns were not much used, although very massive examples occurred as early as the Late Uruk period (mid-fourth millennium BC) in the Pillar Hall of Eanna IV, the main sacred and governmental precinct of Warka (Uruk), in the Sumerian homeland; and there are a few examples in Late Assyrian and Neo-Babylonian work. Even in prehistoric times in the Near East some temples were built with quite thin mud-brick walls, reinforced by buttresses, sometimes of elaborately recessed design, allowing shadows to break up the harsh glare of the sun. This architectural tradition in mud brick was somehow transmitted, by a route as yet unknown, to Egypt at the beginning of dynastic times, when there are other parallels with Late Uruk-period Mesopotamia, to form the prototype of the serekh (palace) facade of the tombs of the Archaic period (Dynasties I-II), and thus also the public buildings in the Nile valley, unfortunately no longer preserved.

In Egypt, sun-dried mud-brick walling never went out of use; it was only for the finest buildings of religious character that cut stone became normal. Even palaces remained relatively frail. For stability, walls of Egyptian buildings diminished course by course towards the top, chiefly because of the alternate shrinkage and expansion of the soil caused by the annual inundations. Since the inner face of the walls had to be vertical for ordinary convenience, it was the outer face only which showed this inward inclination, or 'batter', which remained one of the principal characteristics of Egyptian architecture whether in brick or stone. Sometimes fibre or reed mats were placed between the brick courses at intervals up the walls to reinforce them, particularly at the angles; and a late development was the use of sagging concave courses, for alternate lengths of a long wall, built in advance of the intervening stretches. This allowed the drying out of the inner brickwork of walls such as those round the great temple enclosures which were between 9m (30ft) and 24.5m (80ft) thick. Though the true arch was never used in Egyptian monumental stonework, the principle became known and there are brick vaults as early as the beginning of the Third Dynasty. Frequently the arch rings were built in sloping courses, so that no temporary support centering was needed; usually there were

two or more arched rings arranged concentrically, the one lying upon the other.

Many of the building techniques and processes used by the stonemasons of the Old Kingdom in Egypt were demonstrated in the construction of the royal pyramids. They were built on the bedrock which was levelled to receive them, and the sides scrupulously oriented with the cardinal points. Pyramids were built in a series of concentric sloping slices or layers around a steep pyramidal core: this method of ensuring downward, centripetal thrust achieved the stability essential for these massive structures, although apparently not before at least one serious mishap. The whole mass of the pyramid was first constructed in step-like tiers, until the true pyramidal form was completed. The steps were then filled with packing blocks and brought to their ultimate shape with finely dressed facings, placed at the chosen angle of inclination. The final meticulous dressing of the finished faces was inevitably from top to bottom. The blocks of the Great Pyramid of Cheops at Gizeh, near Cairo, weighing on average 2500 kg (2½ tons), are thickly bedded in lime mortar, used as a lubricant during fixing rather than as an adhesive. Corbelling and flat stone beams were used to cover the interior chambers and in no two pyramids were the same.

The Egyptians did not know of the pulley: their principal tool for raising and turning stone blocks was the lever. To transport blocks overland, wooden sledges were used, with or without the aid of rollers. Blocks of stone for the pyramids were hauled up great broad-topped sloping ramps of sand or earth, reinforced with crude brick walls. The Egyptian mason had at his disposal copper chisels with flanged blades and saws which were work-hardened and therefore brittle: neither bronze nor iron tools were available.

In the temples of the New Kingdom, with their pylons and columned halls, there is considerable evidence of haste, especially from the time of Ramesses II onwards; less care was taken with foundations and with finishing than in earlier times. Perhaps the most vivid evidence of sheer effort is in the obelisks—vast granite monoliths laboriously quarried at Aswan by the patient use of wedges, pounders and fire. Sandstone from the quarries at Gebel Silsileh was the standard building material for the temples of Upper Egypt. It was less suitable for relief-carving than limestone but capable of spanning greater widths for roofing purposes. The influence of the less durable forms of Egyptian architecture is clearly demonstrated both by the imitation of corner and cross-poles in the pylons and by their cornices, derived from the bending of palm leaves above the cross-pole, metamorphosed into the toros moulding. Egyptian columns likewise have vegetable origins, their shafts indicative of bundles of plant stems, gathered in at the base, and with capitals seemingly derived from the lotus bud (p.36G), the papyrus flower (p.36C) or the

ubiquitous palm. As an economy of material and labour, no doubt, the massive roofing slabs of the New Kingdom temples, at first laid on edge for maximum strength, came to be laid flat. By the reign of Rameses II, the elegant columns had become bulbous monstrosities covered with inscriptions which detracted from their essential form.

The Canaanites and their Phoenician descendants in the Levant were skilled stonemasons, whose carefully dressed and finely-jointed masonry laid in even, horizontal courses is first manifest on a large scale in the thirteenth-century BC palace at Ugarit (Ras Shamra), the prosperous commercial city on the Syrian coast. The same fine quality of masonry occurs at Samaria in its first two phases at the time of Omri and Ahab (c. 880–852 BC).

The Anatolian tradition of building was radically different from those of Mesopotamia and the Levant, largely owing to the ample supplies of timber lengths and girths no longer available today after centuries of deforestation. Stone was used for footings, timber for reinforcement or to build a structural framework, and mud brick for walls in one and the same building. An echo of vanished wooden structures is discernible in the massive tomb chambers of the burial mounds of the city of Gordion, capital of the Phrygian kingdom. The double-pitched roof of the chamber of the great Tumulus MM (p.20) was supported by three gables, one in the centre and one at each end, its planks carefully squared and mortised. The walls of this tomb chamber were enclosed in an outer casing of juniper logs, two feet square in section, with a layer of rubble outside the logs supported by a strong retaining wall. A capping of stones and a massive tumulus mound of clay were superimposed and survived till excavated: this, the largest of over seventy tumuli at Gordion, stood about 50 m (166 ft) high. The workmanship was native Phrygian or north-west Anatolian of the Iron Age (c. 700 BC) but the tradition of burial in tumuli derived from south Russia.

The standard of dressing of masonry in Urartu varied widely, the finest ashlar being almost entirely limited to temples, built most often of basalt, which was favoured also for inscriptions and reliefs. At least one temple retains its complete stone footings but none of the mud-brick superstructures survive. One distinctive technique widespread in Urartu was the cutting of foundation ledges, resembling steps, in the steep rock hillside, to provide a firm foundation for the masonry. The construction of massive terraces was an essential part of the building of Urartian fortresses and citadels, and demanded a large labour force. Even in the best-quality works fortress walls were built with slightly irregular courses, each block being individually cut to fit its neighbours. No doubt iron tools were employed: chisel marks are to be seen over much of Van citadel. There are, moreover, Assyrian references to cutting channels through the rock with iron picks.

The background to Achaemenid Persian columnar architecture is now believed to be in Median sites and even earlier and further north at Hasanlu in the Iron II period (c. 1100–800 BC). Wider horizons are also evident at Pasargadae, where, foreign stonemasons were undoubtedly employed by Cyrus the Great and his immediate successors. Rusticated masonry is a feature of the great terrace of the citadel (Takht-i-Suleiman), and another characteristic of Achaemenid construction was the use of swallowtail clamps of lead and iron, as structurally superfluous reinforcement for the great blocks, accurately cut, smoothly dressed and laid without mortar. At least two technical features of the stonework at Pasargadae point to Greek inspiration (p.7). There are traces, on the early works at Pasargadae, of the use of chisels with plain cutting edges; but thereafter, from the accession of Darius the Great (552 BC), the multi-toothed chisel left its imprint on the masonry of Pasargadae and likewise at Persepolis, having first appeared in Greece some fifty years earlier.

Greece and the Greek Empire

Cut stone was used in the prehistoric period, in Crete (where soft gypsum, which can be sawn to shape, was often preferred) and on the mainland, for important buildings, palaces and substantial houses, and the built 'tholos' tombs. Timber frameworks were normal. In the Dark Age all knowledge of sophisticated building technique appears to have been lost, and the few buildings discovered have unworked stone footings with mud-brick superstructures and simple wooden posts supporting roofs which were probably covered with reed thatch. Similar techniques were used in the earliest temples of the eighth century. But development in building technique was considerable during the seventh century. Quarried and shaped stone was used in substantial buildings (for example, the Temple of Poseidon at Isthmia, built before the middle of the seventh century), and terracotta tiles and revetments were developed. In the second half of the century the Greeks secured direct access to Egypt, and thus acquired knowledge of Egyptian stone-working techniques. It became possible to quarry large pieces of stone for monolithic columns, and to turn the blocks on a lathe to secure a truly circular section.

By the Classical period the processes of design and construction had become traditional and fixed. It is doubtful whether drawings were made in detail. Papyrus was limited in size, and expensive, while scaled measuring instruments were not known. It might have been possible to make general drawings and plans on waxed board, but since buildings were traditional in type these were not really necessary. It is more likely that the design was created *in situ*, by

How Blueprints made

measuring out the foundations from which the remaining dimensions could be calculated, in accordance with traditional proportions, though it is clear these were gradually modified. More intricate details would be executed on full-scale models, from which the measurements would be taken (by dividers rather than rulers) for repetition during construction.

Blocks of stone were ordered from the quarry, to be delivered trimmed to size and, where possible, shape (the function of the blocks having been specified). Columns, which had been made with monolithic shafts in the sixth century, were built up from the separate drums dowelled together (except for small-scale work) in the fifth and subsequent centuries. In the quarries at Agrileza which supplied the temple of Poseidon at Sounion it can be seen that column drums were cut to their circular section during the quarrying, rather than turned. Surfaces were left rough (hammer faced) to avoid damage in transit. The blocks were given their final preparation at the building site, where the resulting chippings are often found. Contact surfaces were given final and accurate treatment before being placed in position. Overall dimensions of the building and its elements were worked to a fine degree of accuracy, but there are variations in the measurements of constituent parts; for example, blocks in a wall course may vary from each other in length, but not height or width. Non-contact surfaces were left with a preliminary finish only, except for vital guidelines for future reference which were fully finished. Concealed vertical surfaces (between blocks in a course) were slightly hollowed on their central parts (anathyrosis) to reduce the cost of making an accurate, smoothed contact face.

Blocks were relatively large and retained their position by their own mass and weight; it was not necessary to fix them together in any way, and, in general, foundations and stepped bases were not fixed. Above the base, in important buildings such as temples, it was usual to fix the blocks to each other, to guard against the dangers of earthquake, though the systems employed would never guarantee safety against major tremors. Blocks in wall courses were clamped together with iron clamps set in lead (which was poured round them) (p.20). Generally there was one clamp at each end, though larger blocks might be given pairs of clamps. Courses were dowelled to each other with rectangular dowels, placed at the centre of the block in the lower course, and at the junction of two blocks in the upper. Column drums (and the capitals) were fixed together with metal dowels set in wood, or leaded in. Blocks were lifted by cranes and pulleys, and then levered into their final positions with crowbars (p.20). Some entablatures, particularly in the larger temples, were of considerable dimension and were often made from double stonework, a facer and a backer, or even three blocks, with an additional block between facer and backer, as in the

Parthenon. Walls were usually constructed of single blocks giving the required thickness, but in Hellenistic times the architects of Pergamum constructed walls with inner and outer faces, leaving a space between them which was filled with dry rubble. Single walls were normally formed in Classical temples from ashlar blocks of regular height (isodomic), but varied patterns, particularly alternating high and low courses (pseudisodomic), are known: for example, the temple of Poseidon at Sounion. In their rubble-filled walls Pergamene architects usually alternated the upright pairs of facing stones with low through-stones (headers).

Roofs normally depended on wooden beams and rafters, which were cut to square sections. There are a few buildings with roofs of wide span (the fourth temple of Athena at Delphi, the large dining rooms in the palace at Vergina in Macedon), where beams were made from two long timbers fixed side by side to each other. The ridge beam and other longitudinal beams were supported either on props or on the walls or colonnades, and there is no evidence for the use of fixed, triangular trusses. Roofs may have been fully boarded. Tiles were not nailed in position, but rested under their own weight; it follows that roof pitches were always low, usually about 13-17 degrees.

The ceilings of temples were constructed over the horizontal cross beams. In major temples the cella ceilings were invariably wooden and are totally lost, but that between walls and outer colonnade would be stone, with coffer grids resting on stone beams, apparently recalling wooden forms. Exceptionally, the halls of the gateway building (Propylaea) to the Athenian Acropolis had stone beams and ceilings. Here the span and weight were so great that iron reinforcing beams were set in the marble, but this is unique.

Only after the roof was complete would the finishing processes be applied. Some carved decoration (pediment groups or metope panels in Doric buildings, for example) would be carved on the ground, and incorporated in the structure when finished. Other elements, such as decorative mouldings, were only roughed out during construction, and finished off *in situ*. Finally, the non-contact surfaces on walls and bases, which had been left with a protecting unfinished surface during construction, were carved and polished to the final surfaces and levels indicated by the guidelines. Thus an important Greek building, such as a major temple, was carved into its final form. Stone was selected for the quality it would give to the final finish of the building, and for this purpose marble was preferred. Stone of inferior quality was finished in stucco in imitation of polished marble, and stucco was also used to conceal unbaked mud brick.

Classical, fifth-century Greek architects preferred to work their blocks so finely that the hairline jointing between them was hardly visible: the impression de-

sired was that walls appeared to be made out of solid single slabs of stone. In contrast, individual blocks might be emphasised by drafting their edges, perhaps leaving the inner section with a less finely worked surface. Later architecture took this form of decoration to extremes by leaving the main field of the block quite rusticated. The lower courses of a wall, the dado, orthostates and covering courses, had surfaces projecting slightly from the plane formed by the remainder of the wall, an echo of the contrast between stone footing and mud brick.

Colour work rarely survives. Traces of it were noted on the Parthenon in the nineteenth century, though the colour tones were faded and distorted; perfectly preserved colour work survives more considerably in the Macedonian tombs (Plate 8). The colours—washes of simple, rather harsh tones or in detailed patterns—were not applied to the total surface, but only to emphasise details, such as mouldings, friezes, and the separate rhythm of triglyph and metope in Doric architecture. In Doric it was the entablature which was painted. The taenia and regulae of the architrave were painted red; triglyphs were generally blue. Mouldings, which in Ionic were given carved patterns, in Doric had similar patterns in paint. The band over the frieze in the Macedonian tombs was picked out with a golden-yellow meander. This paintwork serves to emphasise the articulation of the different elements in the design. In addition to this, terracotta revetments, particularly the gutters (simas), provided a strong contrast to the lighter tones of the stonework. It must be remembered that this colour work, though now lost from most buildings, was a vital ingredient in Classical design. It occasionally passed into the stonework itself. The Propylaea and the Erechtheion on the Athenian acropolis made use of a dark grey limestone from

Eleusis to give a contrast to the white of the Pentelic marble: in the Erechtheion it formed the background of the continuous frieze, to which were attached carved figures in white marble.

In the Hellenistic period greater importance was attached to the decoration of interior walls. In some Classical buildings, such as the various temples at Epidauros, interior colonnades were placed against walls to serve decorative rather than structural purposes, though the walls themselves were left plain, or served as backgrounds for attached panel paintings. More complex schemes of decorative painting evolved for walls, enhancing moulded stucco work. This is found, for example, in the houses at Delos, and is similar to the decorative forms on the painted walls of Pompeii. Some walls in Hellenistic Alexandria, in the tombs, had patterns which stemmed from Egyptian architecture. Another Hellenistic development was the attachment to walls built in cruder stone of thin veneer panels of polished stone, often with patterning or made of alabaster or coloured marbles. This technique was taken up by Roman architects.

An important technical innovation, developed in the fourth century BC, was the keystone tunnel vault. There are occasional examples in Egyptian architecture of vaults which approach the true keystone technique (see above), but where the crucial upper sections remain corbelled. The keystone arch and vault were adopted (behind facades preserving the forms of conventional Greek architecture) for the Macedonian royal tombs at Aegae, including that which almost certainly was the burial place built by Alexander the Great for his father, Philip II, in 336 BC. These early Macedonian vaults antedate any proven use of vaulting in Etruscan Italy. They were subsequently employed in fortifications, and, by Pergamene architects, to strengthen terrace walls.

Chapter 4

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THE ANCIENT NEAR EAST

Architectural Character

In the alluvial plains of the Tigris and Euphrates stone and timber suitable for building were rare or unobtainable except by importation. There was, however, an abundance of clay which, compressed in moulds and either dried in the sun or kiln-fired, provided bricks for every kind of structure. Besides massive, towered fortifications, the outstanding constructions were temple-complexes or palaces, temples being typical of Babylonian architecture and palaces of Assyrian. Buildings were raised on mud-brick platforms, and the chief temples had sacred 'ziggurats' (p.68), artificial mountains made up of tiered, rectangular stages which rose in number from one to seven in the course of Mesopotamian history.

Apart from the fortifications and the ziggurats, buildings of all types were arranged round large and small courts, the rooms narrow and thick-walled, carrying brick barrel vaults and sometimes domes. The roofs were usually flat outside, except where domes protruded. Alternatively, in early or commonplace buildings, palm logs supported rushes and packed clay served for coverings, or, for the best work, cedar and other fine timber was laboriously imported. Burnt brick was used sparingly for facings or where special stress was expected. Walls were whitewashed or, as with the developed ziggurat, painted in colour.

Essentially, architecture was arcuated, the true arch with radiating voussoirs having been known by the third millennium BC. For want of stone, columns were not used, except in a few instances in late Assyrian Neo-Babylonian work. Towers or flat buttress strips were commonly vertically panelled and finished in stepped battlements above and stone plinths below, with colossal winged bulls guarding the chief portals, in palaces the alabaster plinths or dadoes of state courts and chambers bore low-relief carving, the walls above them being painted internally with bands of continuous friezes on the thin plaster coverings. Facing with polychrome glazed bricks, introduced by the Assyrians, was another mode of decoration, especially favoured by the Neo-Babylonians in lieu of sculptured stone slabs, since in Babylonia stone was scarcer than in Assyria.

The architecture of the Persians was columnar, and thus vastly different from the massive arcuated architecture of the Mesopotamian peoples they conquered. Flat timber roofs rather than vaults served for coverings, which allowed columns to be slender and graceful, while with their help rooms could be large where necessary, and of square proportions rather than elongated as the Mesopotamian brick vaults demanded. For ceilings, wooden brackets and beams carried by the columns supported a covering of clay on a bedding of reeds on logs or planks (p.90). The use of double mud-brick walls for stability, as at Persepolis, may have allowed small windows just below ceiling level without their appearing on the severe external facades. Stone was plentiful on the upland sites, but used sparingly for such purposes as fire-temples and palace platforms, door and window surrounds, and for richly ornate columns and relief sculpture, often with figures on a modest scale. The Persians were at first relatively inexperienced craftsmen, and drew upon the superior skills of the peoples of their empire; many of the usages and features demonstrate derivation from Egyptian, Mesopotamian, Syrian, Ionian, Greek and other sources.

It would be accurate to claim that the architectural character of the major buildings erected during many centuries in Mesopotamia, and during the Achaemenian period in Iran, exemplify the two main traditions of the Near East as a whole, that of the alluvial river plains and that of the whole highland zone respectively. These were the traditions of clay and wood.

Examples

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The architecture of the ancient Near East is considered under the following headings:

- Early Mesopotamian (fifth to second millennia BC)
- Assyrian and Neo-Babylonian (c. 1859-539 BC)
- Early Anatolian and Hittite (c. 3250-c. 1170 BC)
- Canaanite, Phoenician and Israelite (c. 3250-587 BC)
- Syro-Hittite (c. 1170-745 BC)



The ancient Near East

Urartian (c. 850–c. 600 BC)
 Phrygian (c. 750–c. 650 BC)
 Median and Persian (c. 750–c. 350 BC)
 Seleucid, Parthian and Sassanian (312 BC–AD 641)

Early Mesopotamian Architecture¹⁰

Eridu is the first significant example of the initial association of the Mesopotamian tradition in architecture with that of the Sumerians. A succession of remains of temples has been excavated dating back probably earlier than any yet known elsewhere in Sumer. Temple XVI, the earliest to be uncovered in its entirety, already reveals the central feature of the typical Mesopotamian temple, the 'cella' or sanctuary, with an altar in a niche and a central offering-table with traces of burning. The later temples in this sequence at Eridu are on a much larger scale, with the

emergence of the tripartite plan, having subsidiary rooms on either side of the cella: this plan was to become standard. Here too was first manifested the embellishment of the exterior by alternating niches and buttresses. The exact orientation of a Mesopotamian temple was of great religious significance from this time onward. The predilection for established sites led to enduring continuity in the sites of temples, themselves the nucleus each of its own city.

Warka (Uruk: the Biblical Erech) was by far the largest of the Sumerian cities which eventually, in the Early Dynastic Period (c. 2900–2340 BC), had a perimeter of over 9 km (6 miles). About one-third of this great area was occupied by temples and other public buildings. The two major areas of the city with important buildings were the Eanna and the Anu precincts, associated with the mother goddess and the sky god respectively, and dating back to the late fifth millennium BC. By the late Uruk (or Protoliterate A and B) period the Eanna precinct had become

and if, as the relief of the Musasir temple suggests, the Urartian temples had gabled roofs, these may have resembled that of the Tomb of Cyrus at Pasargadae (q.v.), though in wood instead of stone.

Apart from the temple at Kayalidere, there are temples of the standard plan at Anzavur (with the annals inscription of Menua), Çavuştepe, Toprakkale and Altintepe (pp.85B, 87A) (with a colonnade running round the court in which the temple stands). Open-air rock-cut shrines occur at Van and elsewhere.

The Temple at Toprakkale is also worthy of mention for its rusticated masonry, the centre of each block being left rough and the joints recessed and smooth. Though this occurs at Ugarit in the second millennium BC, there seems no adequate evidence to suggest that the Urartians did not develop this independently. At Toprakkale stones of different colours, limestone and basalt, were used inlaid to achieve a contrast.

The characteristic Urartian tomb was cut out of the solid rock, with niches in the walls for lamps or offerings: such are the tombs in the south side of the citadel of Van and at Kayalidere. At Altintepe there are tombs of comparable design, but of masonry and built into the hillside just beneath the summit of the citadel. False vaults occur in the Altintepe tombs; at Kayalidere there are bottle-shaped shafts accessible only through an opening in the floor of the chamber above (p.87B).

The Shamiram Su (Semiramis Canal) is the most famous of the canals and cisterns which formed a major part of the works of the successive Urartian kings, and was constructed by Menua to bring water from the valley of the Hosap river south-east of Van to the fields and gardens round the capital. This canal is largely visible to this day.

Sculpture was little manifest in Urartu and late in appearance. At Kefkalesi a relief (p.87C) includes a representation of battlements, windows of narrow slit form and doorways. A bronze model from Toprakkale provides similar evidence of the mud-brick superstructure typical of an architectural tradition of which the stone footings alone normally survive, except where fire (as at Kefkalesi and Karmir-Blur) has preserved some of the brickwork.

Palaces

The Palace of Argishti I (c. 786–764 BC) at Arin-Berd (ancient Erebuni), the city which he founded close to the later Karmir-Blur, is the most important Urartian palace known. It was decorated with mural paintings in the formal court style adapted from that of Assyria, with some examples of a freer genre, owing little or nothing to outside influences. This palace included a throne room with two entrances and a courtyard with a wooden gallery supported by fourteen wooden columns on stone bases.

At Giriktepe, close to Patnos, a smaller palace has been excavated: its large hall, decorated with doubly recessed niches, shows similarities to the architecture of the large citadel of Hasanlu (c. 1100–800 BC), a major site just south of Lake Urmia, in a region from which the expanding kingdom of Urartu may have drawn some inspiration for its architecture, at least in mud brick.

At Altintepe (p.87A), near Erzincan, situated by the north-west frontier of Urartu, a palace has been excavated with an audience hall 43.7 m × 24.7 m (143 ft × 81 ft), with six rows of three columns having their superstructure of mud brick, not wood. The diameter of the column bases of stone was almost 1.5 m (5 ft), and they are spaced nearly 5.2 m (17 ft) apart. This hall seems to date from the seventh century BC, a period of revival in Urartu not long before its final eclipse.

Phrygian Architecture

At Gordion, the Phrygian capital, the architecture uncovered by excavations includes houses built on the 'megaron' plan, with its essential features of a front porch flanked by antae prolonging the line of the main walls, and leading into a large room with a hearth at or near its centre. This was suited to the extremes of the Anatolian climate. At one time, perhaps through comparisons with modern Turkish village houses, it was doubted whether these ancient megara had anything but flat roofs. The great width and absence of central pillars might alone have suggested otherwise; the proof of gabled roofs is provided by graffiti on walls of megara, by the roof of the timber tomb chamber of the great tumulus at Gordion, supported by three gables, one in the middle and one at each end, and by at least ten of the rock monuments of Phrygia (p.86C), including those of the so-called Midas City. This group of monuments comprises not tombs but shrines, since the Phrygians had introduced the custom of burial in tumuli. The great gateway of Gordion has a pronounced batter to its facade, and, with the absence of niches and buttresses at regular intervals and the relatively small size of the stones used, these fortifications are quite different in style and construction from the Urartian.

At Midas City the carved facades show the timbers crossing at the apex of the gable, as on the graffiti at Gordion, and reveal other architectural features too. One chamber is carved to imitate a house built of logs; in the so-called Tomb of Midas's Wife there are two shuttered windows carved in the gable; doors are represented as opening inwards; the so-called Broken Tomb has a large chamber hewn out of the rock to represent the interior of a house, with benches along three sides, and in the Lion Grave there is a carved bed inside the chamber.

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A distinctive feature of Phrygian architecture was the use of terracotta tiles as ornament, represented by examples from Gordion and from Pazarli, in central Anatolia; they may also be rendered as geometric patterns on the façades of two of the shrines of Midas City. These tiles seem to have been used as a frieze beneath the pediment of gabled buildings. Vertical and horizontal beams and cross-ties were used in the wooden framework of some of the Phrygian buildings of Gordion. Together with the chamber of the great tumulus and the ornate furniture found there they attest to the wide variety of Phrygian wood-working and the high level of skill achieved in an essentially Anatolian civilisation, owing much to Assyria, and perhaps also to Urartu, but at the same time preserving its own identity.

Median and Persian Architecture

The architectural achievements of the Medes and Persians before the reign of Cyrus the Great have recently been recognised in buildings of the eighth-seventh century BC excavated in western Iran, at Godin Tepe, Baba Jan and Nush-i Jan.

At Godin Tepe, Level II, the upper citadel originally comprised a fortified manor, or minor palace, which centred around a larger and a smaller columned hall, with additional smaller rooms and rows of magazines; the whole was protected by a fortification wall with bastions, a tower and arrow slots.

At Baba Jan, in Levels II and I, the manor must have presented a formidable façade, being defended by eight rectangular towers, one of which was replaced in Level I by a columned portico as the main entrance; the space within the towered wall comprised a rectangular court, later roofed, with a long room on either side. A contemporary building in another part of the same site had one room decorated in a style unknown elsewhere, with heavy painted wall tiles. Columns were also a feature of a large citadel building, approximately contemporary with the manor of Baba Jan, at Haftavan Tepe, in the Urmia basin of north-west Iran.

At Tepe Nush-i Jan, near Hamadan (Ecbatana), well-preserved mud-brick buildings of Median date have been uncovered in Level I (c. 700–550 BC) (p. 91D). In one building the earliest known example of a fire altar has been discovered. Unusual mural decorations, suggesting long experience in the use of mud brick, include recessed crosses, blind windows, and holes with the appearance of serving to support a scaffold. Another building was a fort, with ramp leading to a staircase, turning round a central pier and roofed with a mud-brick corbel-vault. The palaces and tombs of the Persians show that many features of their remarkable columnar architecture were derived from the older civilisations: the gorge mould-

ing from Egypt; the sculptured monsters, relief-carved orthostats and polychrome glazed brickwork from Mesopotamia; the style of masonry indirectly perhaps from Urartu.

The site of Pasargadae comprises four groups of structures scattered over a plain, centred round the citadel, the residential palace, the tomb of Cyrus and the sacred precinct respectively. Rusticated masonry is a feature of the great platform of the citadel (Takht-i-Suleiman), whose ambitious plan was abandoned, presumably at the death of Cyrus (530 BC), in favour of a more modest scheme in mud brick. The Tomb of Cyrus (p. 86B), a simple box-like monument of limestone 3.2 m × 2.3 m (10 ft 6 in × 7 ft 6 in), gabled, and standing on a platform of six steps, is typically Achaemenian in its use of large blocks, accurately cut, smoothly dressed, without mortar but reinforced by swallowtail clamps of lead and iron. Its design, based on an early type of gabled house, is paralleled in the southern Zagros highlands by the tomb of Gur-i-Dokhtar, and has possible antecedents in the underground tombs with gabled roofs in Luristan and in central Iran at Tepe Sialk, near Kashan. A continuing tradition of gabled roofs is suggested by their occurrence in all the finished chambers of the rock-cut tomb of Darius I.

Susa, ancient city of Elam, became the Persian capital in succession to Babylon with the building there of a citadel and palace complex by Darius I (522–486 BC). A most illuminating building inscription tells how the resources and skills of the whole empire were utilised in the construction of the palace buildings. Cedar was brought from Lebanon, teak from the Zagros mountains and southern Persia, while the baked bricks were made by the Babylonian method. Most significant of all, craftsmen were drawn from the Assyrians, Babylonians, Egyptians and Ionian Greeks. The remarkable compound of features which constitute the unique and gracious architecture of Persia is thus explained. From this palace and a later one by Artaxerxes II (404–358 BC) come the famous glazed-brick decorations, portraying processions of archers, lions, bulls or dragons (p. 90F, G).

The Palace of Persepolis (pp. 90A–E, 91A), begun in 518 BC by Darius I, was mostly executed by Xerxes I (486–465 BC) and finished by Artaxerxes I about 460 BC. The various buildings stood on a platform, partly built up and partly excavated, faced in well-laid local stone bound with iron clamps, about 460 m × 275 m (1500 ft × 900 ft) in extent and rising 15 m (50 ft) above the plain at the base of a rocky spur. The approach on the north-west was by a magnificent flight of steps, 6.7 m (22 ft) wide, shallow enough for horses to ascend. A gatehouse by Xerxes had mud-brick walls, faced with polychrome bricks, and front and rear portals guarded by stone bulls. A third doorway on the south led towards the 'Apadana', a grand audience hall, 76.2 m (250 ft) square and with

thirty-six columns within its 6 m (20 ft) thick walls, begun by Darius but completed by his two successors. It stood on its own terrace, 3 m (10 ft) high; had three porticoes, each with double colonnades; stairways on the north and east sides; and minor rooms across the south side and in the four angle towers. The Palace of Darius, small by comparison, lay immediately south of the Apadana, near the west terrace wall. This might have been finished in his lifetime, as also the terraced 'Tripylon', which lay centrally among the buildings and acted as a reception chamber and guard-room for the more private quarters of the palace group. Also by Darius was the 'Treasury', in the south-east angle of the site, a double-walled administrative and storehouse building with columned halls of different sizes and only a single doorway. The buildings of Darius were arranged in the loose fashion of earlier times. Xerxes added his in between. He built his own palace near the south-west angle, connected with an L-shaped building, identified as the women's quarters (harem) which completed the enclosure of a court south of the Tripylon. He also commenced the famous 'Hall of the Hundred Columns' (finished by Artaxerxes I); this is a Throne Hall, 68.6 m (225 ft) square, with columns 11.3 m (37 ft) high, supporting a flat, cedar roof (p.90A,C). The walls were double, except on the north side, where a portico faced a forecourt, with its own gatehouse, separated from the Apadana forecourt by a stout wall. The Throne Hall had two doorways and seven windows on the entrance wall, matched on the other three sides except that niches replaced the windows. All were framed in stone surrounds in the 3.4 m (11 ft) thick brick wall.

From Persepolis have been recovered many wonderful architectural sculptures. All the monumental stairs were lined with reliefs, as also the Apadana terrace, where they were arranged in triple tiers or 'registers', separated by bands of rosettes. Nobles, courtiers, chieftains, tribute-bearers and guardsmen advanced in dignified procession, and traditional subjects filled the awkward angles of the stairways and the deep jambs of the doorways (p.90E). Stepped battlements crowned the parapet walls. All these sculptures were originally in brilliant colour. Columns of the lesser apartments had wooden shafts, thickly plastered and decoratively painted, but those of the Halls were of stone throughout. They have a character all their own, with moulded bases, fluted shafts and curious, complex capitals with vertical Ionic-like volutes and twin bulls or dragons supporting the roof beams (p.90B,D).

The Tomb of Darius, Naksh-e Rostam (485 BC) (p.91B), 13 km (8 miles) north of Persepolis, is one of four rock-hewn sepulchres of the great Achaemenian kings. Its facade, 18.3 m (60 ft) wide, appears to reproduce the south front of Darius' palace at Persepolis, with four columns of the double-bull type, central doorway with Egyptian-like cornice, and upper com-

partment in which an elaborate throne, 2.7 m (9 ft) high, is supported by two rows of figures, above which the king stands before a fire altar. Near the tomb stands a Fire Temple, a stone square tower containing a single room, approached by an outside stairway (p.91C).

Seleucid, Parthian and Sassanian Architecture

The Seleucid Empire, founded in 312 BC after the death of Alexander, began to disintegrate about 247 BC, and after 140 BC was confined to the region west of the Euphrates, finally giving way to the Romans in 64 BC. Meanwhile there was a considerable influx of Macedonian and Greek settlers, who built many new towns, including Seleucia, near Babylon, and Antioch, in Syria. In Bactria, on the eastern border, they spread Greek civilisation to India; but in general their influence was uneven, and in art and architecture it was sometimes the Hellenistic and sometimes the local Persian character that prevailed. The Parthians, who wrested the eastern and Mesopotamian territories piecemeal from the Seleucids, respected the Hellenistic culture and institutions and under their long rule the new Greek cities flourished. Yet as integration proceeded, the arts profoundly declined. With the Sassanian dynasty (226-642), when the principal city was Ctesiphon, near Babylon, vigour sprang anew and a number of fine buildings were erected which form a connecting link between the old Mesopotamian architecture on the one hand and Byzantine on the other. Palaces were the dominant type.

The Palace, Feruz-abad (south of Persepolis) (c. 250) (p.92), built of stone rubble faced with plaster, has a deep, open-fronted arched entrance leading to three domed halls, forming a reception suite, beyond which is a court surrounded by private chambers. The domes are seated over the three square halls with the help of 'squinch' arches thrown across the angles (p.92C), while the internal walls below them are ornamented with niches having plaster archivols and enframements of a classical complexion but capped with cornices of the Egyptian 'gorge' type (p.92C,F).

The Palace of Shapur I, Bishapur (west of Persepolis) (c. 260), was a remarkable building built of plastered stone rubble, with a cruciform plan, dominated by a central dome of elliptical section springing from floor level. The coloured-plaster wall-decoration of modelled architectural features again had a classical character.

The Palace, Sarvestan (vicinity of Persepolis) (c. 350) (p.92) was fronted by the typical deep barrel-vaulted porches, behind which rose a beehive dome, carried on squinch arches (p.92H), marking the principal apartment. The dome was pierced with open-

Chapter 5

GREECE

Prehistoric Architecture

In the Aegean, during the prehistoric period, there were two distinct architectural traditions which can be seen clearly in the domestic buildings of the Early Bronze Age: one in which the typical house was a free-standing hut with just a single room, and the other in which houses consisted of an apparently random and totally asymmetrical agglomeration of rooms. The differences are, as much as anything, geographical. The first is found in mainland Greece and the north-east regions, most notably at Early Bronze Age Troy, the second in Asia Minor and in Crete. Few buildings in this period were monumental, with the exception of those on the citadel of Troy which included a large rectangular hall (Building IIA), consisting of a room which was nearly square with a deep porch formed by prolonging the side walls: this is the so-called megaron plan, which was to be the basis of the Classical Greek temple.

In the second millennium BC there were important developments in the agglomerated buildings of Crete. Maritime contact with the eastern Mediterranean had created increased wealth there, and this was reflected in the building of 'palaces', the residences of powerful rulers who controlled the towns in which they were situated. But in addition they housed the administration and served as places of manufacture and storage. An essential feature, adopted from the Near East and Egypt, was the arrangement of rooms (at this time still quite asymmetrical) round a courtyard, which might well be totally enclosed. The first palaces were built in the nineteenth century BC but obliterated about 1625 BC in a series of catastrophic earthquakes. They were then rebuilt in a more sumptuous manner, but all were destroyed (along with country houses and the towns) in the mid-fifteenth century BC, the only known exception being the greatest, Knossos, which survived until about 1375 BC. During its last years Knossos was occupied by Greek-speaking peoples; it is not certain whether the whole of Crete was ruled from Knossos, since there may have been other palaces not yet excavated in western Crete, but it is clear that Knossos dominated the eastern half of the island.

The Palace of Knossos (p.97) was arranged round an open court measuring 170×82.5 'Minoan' feet of 0.3036 m. The buildings covered 122 m (400 ft) square (approximately 1.6 hectares, 4 acres). Outside was another paved court (the west court) crossed by raised walks, a typical feature of Minoan architecture, and overlooked by the monumental west facade, with the principal entrance at its southern end. Characteristically for Minoan architecture, this entrance, to the western state rooms, was indirect and dog-leg in form. The buildings of the palace had at least two storeys. The ground floor consisted mostly of storage rooms. Those in the west wing contained oil jars, whereas others on the north side were probably granaries. The most important room at this level in the west side was the so-called throne room, approached from an anteroom, at a level lower than the court, from which it opened by four pairs of folding doors. The throne room itself was dark and mysterious: the stone throne was against the north wall, and flanked by benches, the walls decorated with frescos. The purpose is religious rather than royal.

On the principal (first) floor of the west wing were spacious state rooms. The restored piano nobile illustrates the way in which rooms in the palace were arranged for functional purposes (here clearly ceremonial) rather than for reasons of symmetry. On the north side of the court was a separate entrance, approached from the 'theatral area' outside the palace. To the east of this were rooms for industrial activity. Centrally in the east wing, at the upper level, was a further hall of state. Near the south-east corner of the central court the slope was cut away to accommodate the three-storey royal apartments. The uppermost storey was on a level with the court; the other two are below court level, and faced eastwards over terraced gardens. The rooms here were thus isolated from the court, though connected with each other. Passages were cool and the area was lit by three light wells. Rooms were approached through rows of double doors, so that they could be opened, or totally or partially shut off; everything was designed to permit the circulation of cool air, to counteract the intense heat of the Cretan summer. The

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ings for light and ventilation. Two long side chambers had barrel vaults supported on massive piers which themselves stood on pairs of stumpy columns (p.92K), a most ingenious method of reducing the effective span and obtaining powerful abutment to the vaults.

At Feruz-abad and Bishapur there were towered fire-temples, used in connection with open-air ceremonies, similar to that at Naksh-i-Rustam (see above).

The Palace, Ctesiphon (p.92) is usually attributed to Chosroes I (531-579) but is probably of the fourth century. As it is in the Mesopotamian plain, it is of brick. The principal part surviving is a vast banquet-hall, open-fronted like the reception tents of tribal sheiks in nomadic days, with flanking private wings screened by an enormous wall, 34.4 m (112 ft 6 in) high. The latter is ornamented with tiers of attached columns and arcades, an arrangement betraying Roman influence. One wing of the facade fell in 1909 after an exceptional Tigris flood. The elliptical barrel vault over the hall, 7.3 m (24 ft) thick at the base and rising 36.7 m (120 ft) from the floor to cover the 25.3 m (83 ft) span, equalled if it did not surpass the mightiest structural achievements of Ancient Rome. The lower part of the vault is constructed in horizontal courses—Sassanian domes were usually constructed wholly in this manner—but substantially the vault is made up of arch rings sloped against an end wall, so as to avoid the necessity of temporary wood centering. This was a practice adopted for brick vaults equally in Ancient Egypt and in Assyrian architecture.

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The central lands of the Greek world

stairways, light wells, and colonnades of downward-tapering cypress-wood columns were typically Minoan, as were the elaborate and developed sanitation and drainage. In plan, particularly, the palace appears at a first glance to be chaotic, but its layout was the result of organic growth; this can best be appreciated from within, particularly in those domestic quarters which Sir Arthur Evans restored in order to give a proper impression of their character. Other Cretan palaces (such as Phaistos, Mallia and Zakro) were smaller but similar in style.

More ordinary domestic architecture of the Minoans is represented by a house at Pyrgos, in the south-west of Crete, built of gypsum blocks, with a first-floor verandah (with three Minoan columns) placed directly over the porch; the effect is of a smaller-scale version of the domestic quarters of the palaces. Particularly well preserved are the town

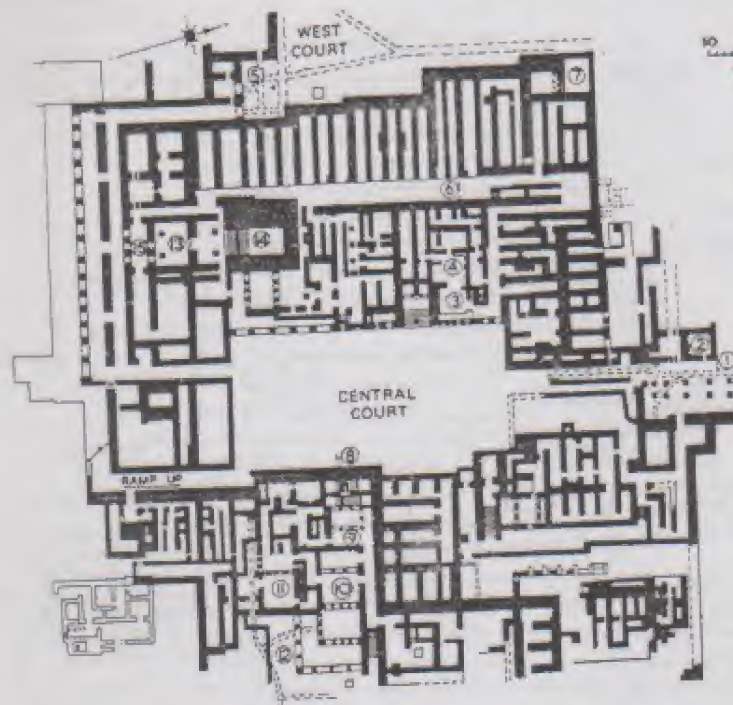
houses at Akrotiri, on the island of Thera, buried during the eruption of the volcano in the fifteenth century; these too are typified by their irregular agglomeration of rooms, with large window openings and balconies.

The tombs of Minoan Crete are not monumental. Some are rectangular structures subdivided into small rooms, whereas others are simple rock-cut chambers.

On the mainland of Greece, the buildings of the early second millennium BC were free-standing megaron houses. In the second half of the millennium, Cretan influences and political developments led to the evolution of palaces, and the introduction of the courtyard. In these palaces, however, the megaron, even when flanked by other rooms, remained the essential feature.

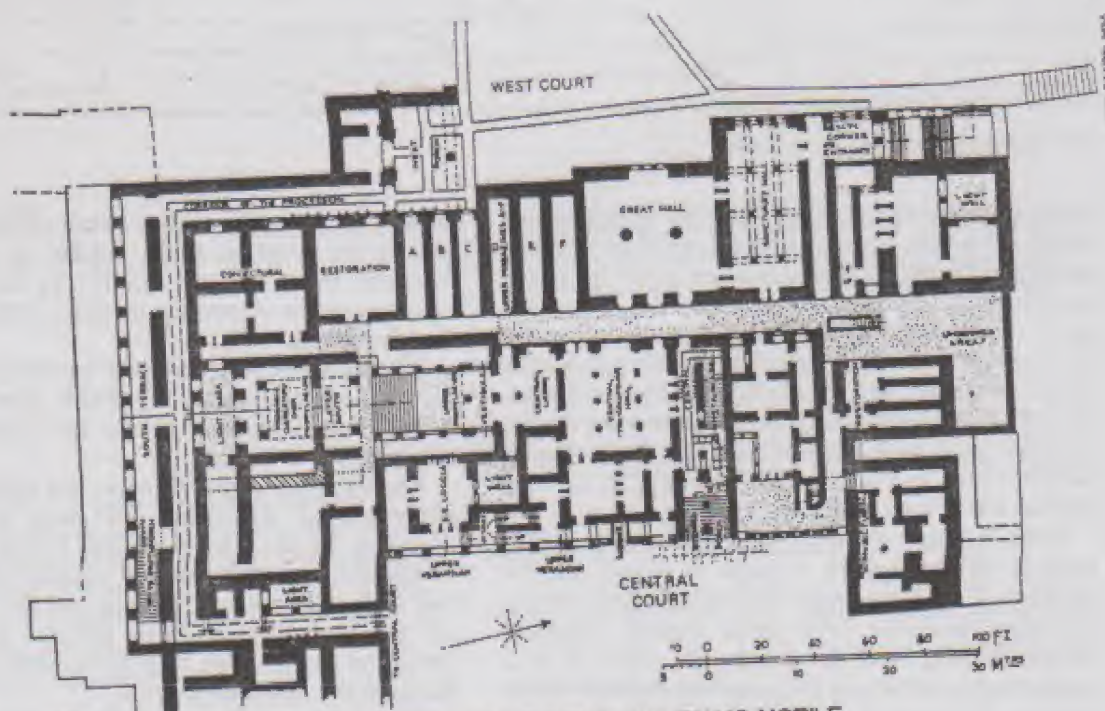
The Palace at Tiryns (p.99) is on a low, rocky

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PALACE OF KING MINOS:
KNOSSOS, CRETE



- 1 NORTH ENTRANCE & PORTICO
- 2 BASTION & GUARD HOUSE
- 3 ANTEROOM TO THRONE ROOM
- 4 THRONE ROOM WITH TANK
- 5 WEST PORTICO
- 6 LONG GALLERY WITH MAGAZINES
- 7 STAIRS UP TO MAIN FLOOR
- 8 STAIRS TO ROYAL APARTMENT
- 9 HALL OF THE COLONNADES
- 10 HALL OF THE DOUBLE AXES
- 11 QUEEN'S SUITE
- 12 BUILT DRAINS
- 13 PROPYLEUM
- 14 GREAT STAIR TO STATEROOMS
- 15 PROCESSIONAL CORRIDOR

A PLAN AT
LEVEL OF COURT



B PLAN (RESTORED) OF ENTRANCE SYSTEM AND PIANO NOBILE
OF WEST PALACE SYSTEM

citadel hill, in prehistoric times situated by the edge of the sea. There are traces of Early Bronze Age buildings (including an enigmatic circular structure of baked brick) but the visible remains are of the Late Bronze Age. Massive fortifications to the upper part of the citadel were constructed in the second half of the fourteenth century BC in the irregular style of masonry termed cyclopean by the Greeks of the Classical period. Later additional walls included a slightly lower terrace to the north, and a long, narrow approach on the east side provided with two gates, which could be barred. Towards the end of the thirteenth century BC the area of the fortification was doubled by enclosing yet another terrace to the north. Such defences are in direct contrast to the more open character of the Minoan palaces.

The palace at Tiryns was on the upper part of the citadel. When the fortifications were strengthened the original gateway on the east side was replaced by a decorative propylon, H-shaped in plan, with a single door in the cross-wall and columns between the side walls, at front and back. In front of this was a forecourt with a colonnade along the outer wall, containing a row of magazines, built of massive blocks and roofed by means of corbelled vaults; there was a similar row of magazines at the south end. The propylon led to an outer court, on the north side of which a second propylon, similar in plan, led to an inner court, flanked on the east, south and west sides by wooden colonnades; at the centre on the north side was the colonnaded porch of the principal megaron. This porch gave access to an anteroom through a triple opening comparable with those in Minoan palaces. Behind this the main, inner room contained a large circular decorated hearth in a group of four columns which probably supported a lantern. The floor of this room was plastered and painted, with a space, presumably for a throne, on the east side. The walls of the anteroom were decorated at the base with an alabaster frieze, with a pattern of two semicircles, back to back, between vertical rectangular panels each divided into three vertical bands; it has been suggested, plausibly, that this design is the origin of the triglyph and metope pattern of the Doric order.

The Palace at Mycenae is essentially similar. Vast fortifications were constructed at the same time as those of neighbouring Tiryns, probably by the same workmen and certainly in the same style. The principal feature is the entrance, which is protected by a flanking bastion. The gate is at the inner end; great upright stone jambs 3.1 m (10 ft) high support an immense lintel 4.9 m long \times 1.06 m high \times 2.4 m deep (16 ft \times 3 ft 6 in \times 8 ft) over an opening 3 m (10 ft) wide. Above is a triangular-shaped, corbelled opening filled with a stone panel, bearing a carved relief depicting two rampant lions facing a central column of the downward-tapering type. This is the Lion Gate (pp. 99C, 100H), which takes its name from this carving. Inside the fortification, by the gateway, is a

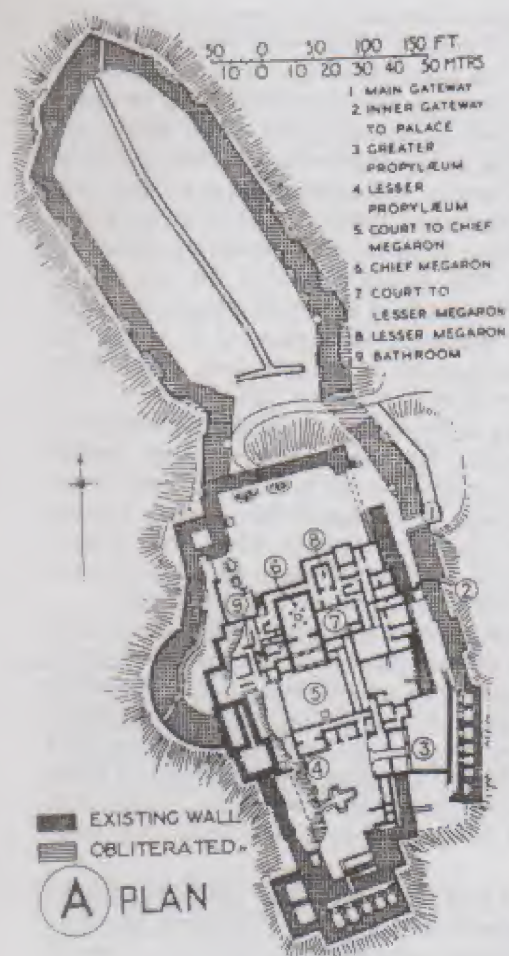
circular enclosure formed by an inner and outer row of continuous upright stones with horizontal slabs over them; this surrounded the shaft graves of the burial place of kings who ruled before the fortifications were built (a second grave circle always remained outside the fortified area). Further inside the citadel were houses, and amongst them a shrine, the 'house with the idols', distinguished by fresco paintings depicting a goddess, and containing terracotta cult figures. The palace proper at the top of the citadel was simpler than at Tiryns: a plastered court led to the megaron, consisting of a porch, an antechamber entered by a single door, and a main room 13 m \times 12 m (42 ft 6 in \times 39 ft 3 in).

The Palace at Pylos had a courtyard leading to a megaron porch, but the inner room with central hearth and columns was set to the side, more in the Minoan manner. To the east of this another, smaller court led to the main megaron, which was conventionally aligned, and an anteroom with a single central door. This palace was not heavily fortified.

The most impressive and substantial tombs of Late Bronze Age Greece (about 1600 BC) are the 'tholoi', circular chambers cut into the hillside, approached by an open passage or 'dromos' and lined with masonry. The chambers were corbel-vaulted structures shaped like old-fashioned beehives, the upper part of which emerged above ground level, and were covered with a mound. After the final burial the dromos was filled in.

The most splendid tholos is at Mycenae, the so-called 'Treasury of Atreus' (or 'Tomb of Agamemnon', both names being applied to it in later, Classical times) (p. 100). It was built after 1350, but before 1250 BC. Here the stone lining is of excellent quality masonry throughout. The dromos is about 6 m (20 ft) wide and 36 m (118 ft) long, its side walls rising to a maximum of 13.7 m (45 ft) at the entrance to the chamber. The chamber itself is 14.5 m (47 ft 6 in) in diameter and 13.2 m (43 ft) high, made up of thirty-four circular courses of masonry, cut during construction to give the final curvature, and capped with a single block of stone. There are clear indications that decoration, probably metal, was attached to the walls. A lateral rock-cut chamber 8.2 m (27 ft) square and 5.8 m (19 ft) high, possibly once lined with masonry, was the actual place of burial. The facade to the main chamber is over 10.3 m (34 ft) high, with a doorway 5.4 m (17 ft 9 in) high. The entrance passage is 5.4 m long, and roofed by two enormous limestone lintels, one of them weighing more than 100 tons. On either side of the door were two green limestone half-columns (large portions of which are preserved in the British Museum). They are of the usual tapering form, and decorated with bands of chevron ornament in relief. The triangle over the lintel contained slabs of deep red stone, carved with horizontal bands of connected spirals, separated by mouldings, with plain bands between them. A strip of green stone,

THE CITADEL OF TIRYNS



CYCLOPEAN



POLYCONAL



RECTANGULAR



INCLINED BLOCKS

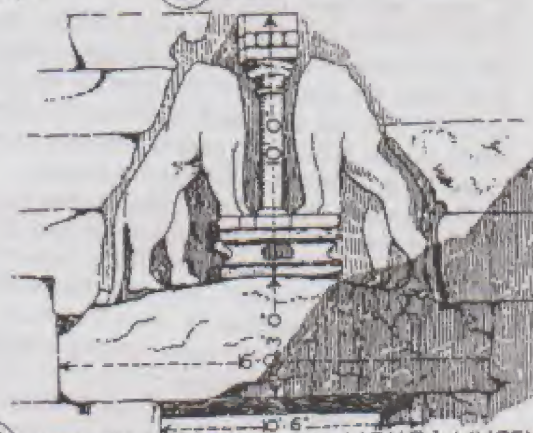
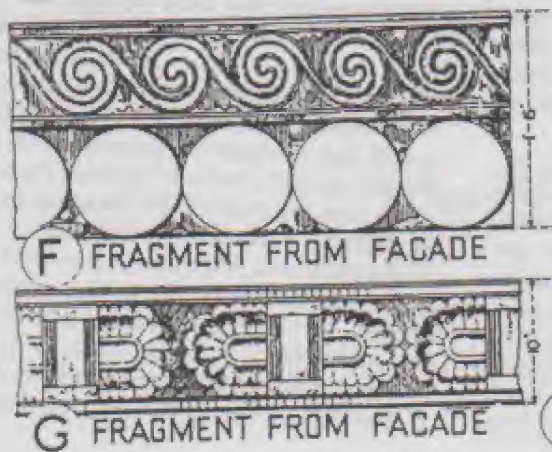
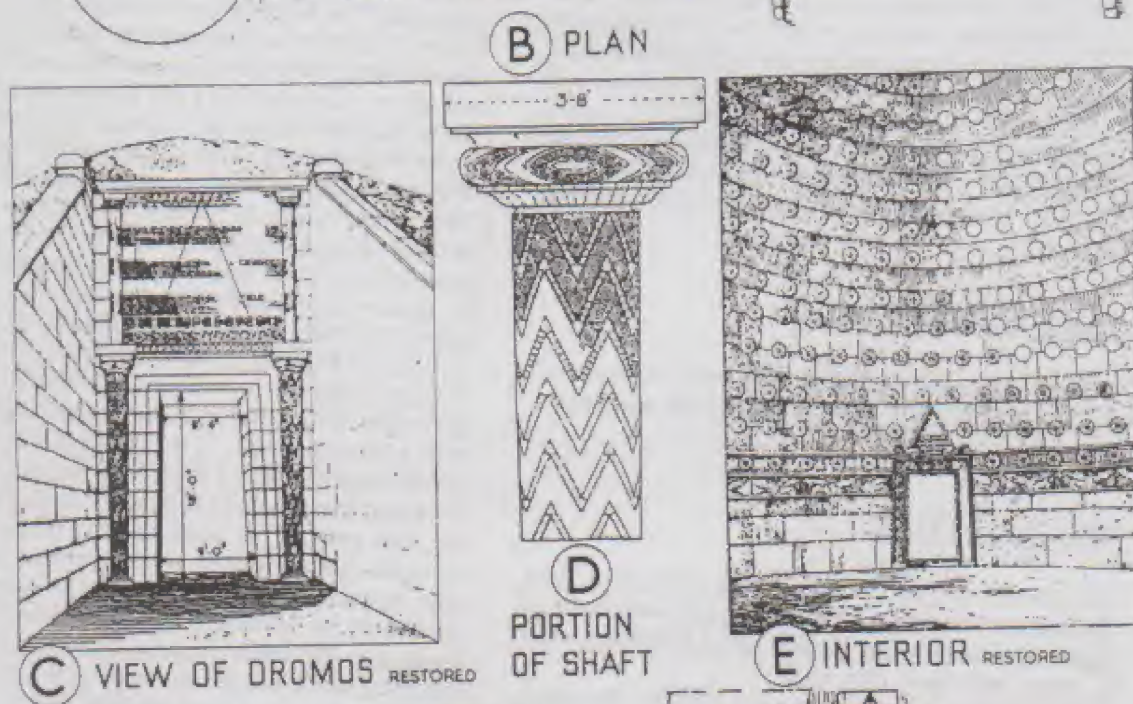
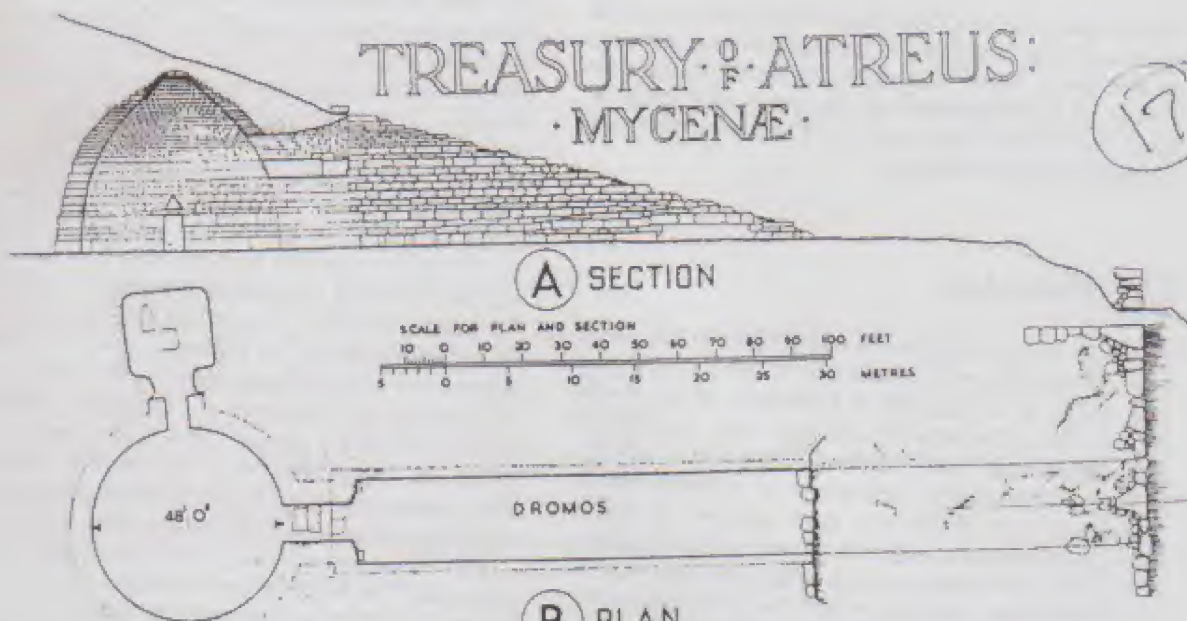
B METHODS OF WALLING

C. (right) The Lion Gate, Mycenae (c. 1250 BC). See p.98



TREASURY OF ATREUS: MYCENÆ

17 20



carved with a row of discs and surmounted by rising spirals and the triglyph and metope pattern, appears on the lintel. Other important tholos tombs are the 'Tomb of Clytemnestra' at Mycenae, the door of which had fluted shafts, and the 'Treasury of Minyas' at Orchomenos in Boeotia.

The 'Dark Age'

The only known substantial building from the Dark Age which followed the collapse of the Late Bronze Age states is the **Heroon at Lefkandi**, of the tenth century BC. This was of unbaked brick, apsidal in plan, measuring 10 m by at least 45 m (33 ft × 148 ft). It had a surrounding colonnade of wooden posts. Despite its resemblance to later temples, it was a funerary monument built over a grave, and so short-lived that it is unlikely to have influenced later buildings. Otherwise, buildings which can be recognised as temples are not found before the eighth century BC. These are simple, horseshoe-shaped structures with porches at the end, built of mud brick on rubble footings (as at Perachora near Corinth) or wooden framing with wattle infill over timber sleepers (as at Eretria). The roofs of both buildings were of thatch.

The Classical Period

The principal orders of Classical Greek architecture, the Doric and Ionic, were first used for temples.

The Doric Order

The Doric column (p.102) stands without a base directly on a crepis (or crepidoma), conventionally of three steps in temples, though other buildings, such as stoas, may have only one.

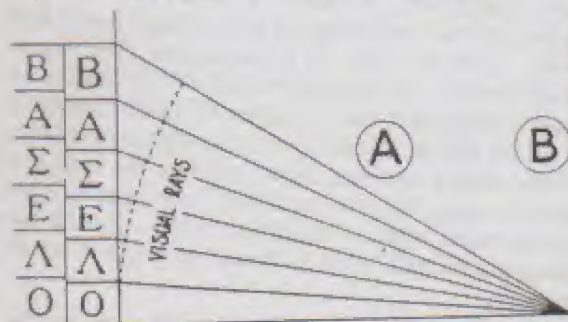
The earliest columns are very slender, but later ones are excessively thick, with a height no more than four times the diameter at the base. In the fifth century BC this was lightened to $5\frac{1}{2}$ to $5\frac{3}{4}$ diameters, while in the Hellenistic period columns over seven times their diameter in height are known.

The circular shaft, diminishing at the top to between $\frac{3}{4}$ and $\frac{2}{3}$ of the diameter at the base, is usually divided into twenty shallow flutes or channels separated by sharp 'arrises', but sometimes there are twelve, sixteen, eighteen or, as at Paestum, twenty-four (p.103C). The shaft has normally a slightly convex profile called the entasis, to counteract the concave appearance produced by straight-sided columns (p.104). The shaft terminates in the 'hypotrachelion', usually formed of three grooves in archaic examples

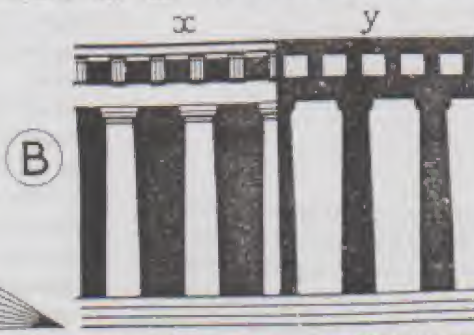
and later of one groove; immediately above, on the block which forms the capital, is the continuation of the fluted shaft known as the 'trachelion' or necking. The distinctive capital consists of abacus and echinus. Near the base of the echinus are 'annulets' or horizontal fillets, from three to five in number, which stop the vertical lines of the arrises and flutes of the shaft. The form of the echinus varies with the date of the building. In the earlier temples at Paestum (p.103B,C) it projects considerably and is fuller in outline, whereas in mature examples, such as the Parthenon (p.103F), the projection is less and the profile more subtle; in Hellenistic work, when the column has become more slender, the whole capital is shallower and narrower and the curve of the echinus approaches a straight line. The abacus, which forms the upper member of the capital, is a square slab, unmoulded until the Hellenistic period when it sometimes acquired a small moulding at the top.

The Doric entablature (p.102) has three main divisions. (a) The architrave or principal beam, which in larger temples usually is made up of two or three slabs in the depth, the outermost showing a vertical face in one plane. Capping it is a flat projecting band called the taenia, and under this, at intervals corresponding to the triglyphs, are strips known as the regulae, each with six guttae or small conical drops below it. (b) The frieze, which is formed of triglyphs with two vertical channels (glyphs), and two half channels at each side (so 'three glyphs') alternating with metopes or square spaces sometimes ornamented with fine relief sculpture, as in the Parthenon (pp.102, 115 A,B,C). A triglyph is aligned over each column and another centrally over each intercolumniation. At the angles of the temple, however, two triglyphs meet with a bevelled edge. It is a general rule that Doric friezes must end with a triglyph, which may be moved outwards from its proper position over the centre of the end column: to achieve this, the columns are brought closer together at the corners. (c) The cornice or geison, which is the upper or crowning part. The soffit or underside has an inclination approximating to the slope of the roof, and has flat blocks or mutules, which suggest the ends of sloping rafters. A mutule occurs over each triglyph and each metope, and is usually ornamented with eighteen guttae, in three rows of six each. The vertical face, or corona, has an overhanging drip at the bottom. The top is occasionally surmounted by a continuous sima or gutter (for example the Temple of Zeus at Olympia) but this is often omitted (as in the Parthenon). In the latter case the ends of the cover tiles are stopped by antefixae. The sima always crowns the raking cornice of the pediment, which is not provided with mutules, and is identical in profile to that of the Ionic order. Indeed, the first recorded use of the word Ionic as an architectural technical term is to describe the raking cornice of the Doric porch to the Telesterion at Eleusis, of the mid-fourth century BC, on the

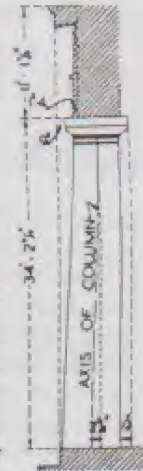
OPTICAL CORRECTIONS IN ARCHITECTURE



A CORRECTION OF APPARENT PROPORTIONS FROM AN INSCRIPTION ON THE FACES OF THE ANTE OF A TEMPLE AT PRIENE

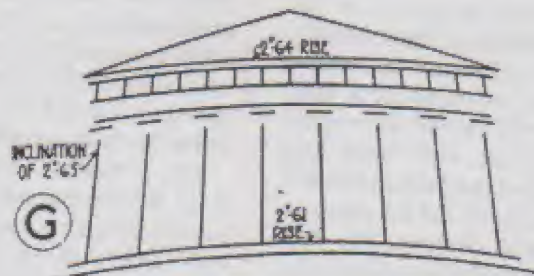
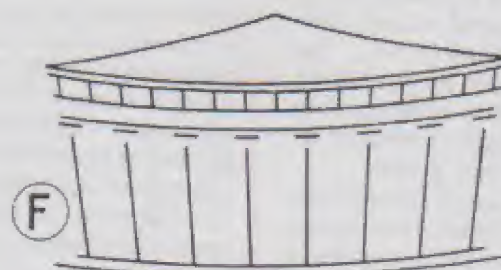


B COLOUR EFFECT ON PROPORTIONS
 x THE METOPES & NAOS WALL BEING BLACK THE COLUMNS APPEAR STURDIER & THE ARCHITRAVE, TRIGLYPHS & CORNICE HAVE IMPORTANCE
 y WITH REVERSED COLOURING THE COLUMNS APPEAR THINNER & HIGHER & THE ENTABLATURE LOSES IN IMPORTANCE.



C THE PARTHENON INCLINATION OF COLUMNS AND ENTABLATURE

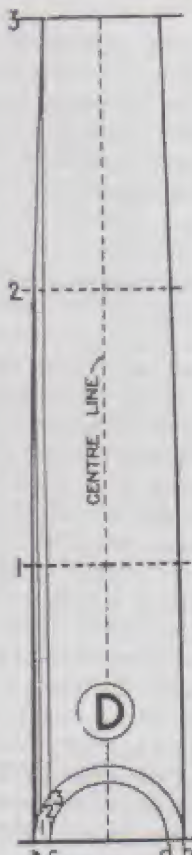
THE PARTHENON ATHENS: EAST FRONT



E THE TEMPLE FRONT AS IT APPEARS IN EXECUTION WITH CURVED HORIZONTAL LINES AND INCLINED VERTICAL FEATURES AS AT G.

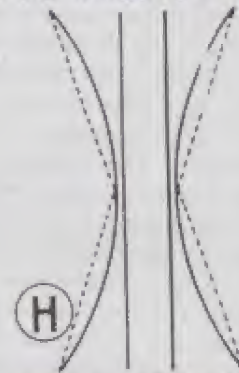
F THE TEMPLE FRONT AS IT WOULD APPEAR IF BUILT AS AT E WITHOUT OPTICAL CORRECTIONS.

G THE TEMPLE FRONT ARRANGED WITH VERTICAL AXES INCLINING & WITH CONVEX STYLOBATE, ARCHITRAVE, ENTABLATURE & PEDIMENT PRODUCING RESULT AS AT E.



D METHOD FOR ENTASIS

abcd ARE BOTTOM & TOP DIAMETERS RESPECTIVELY. DESCRIBE SEMICIRCLES ON THESE & AT c ERECT PERPENDICULAR CUTTING LARGER ONE IN 3. DIVIDE SEGMENT a 3 & HEIGHT OF COLUMN INTO ANY NUMBER OF EQUAL PARTS - SAY 3 - & NUMBER BOTH 1, 2, 3 FROM a. THIRD POINTS 1, 2, 3 IN SEGMENT ERECT PERPENDICULARS CUTTING CORRESPONDING DIVISIONS OF THE HEIGHT. THROUGH THE POINTS THUS OBTAINED DRAW CURVE



H PARALLEL STRAIGHT LINES HAVING CONVEX CURVES ON EITHER SIDE APPEAR WIDER APART IN THE CENTRE.



J PARALLEL STRAIGHT LINES HAVING CONCAVE CURVES ON EITHER SIDE APPEAR CLOSER TOGETHER IN THE CENTRE.

A SIMILAR EFFECT PRODUCED BY INCLINED LINES AS INDICATED IN H & J BY DOTTED LINES

inscription which records the specification for that structure.

The Ionic Order

Ionic columns, including capital and base, are usually between nine and ten times their lower diameter in height and have twenty-four flutes separated by flattened arrises. Early examples, however, may have as many as forty, forty-four or forty-eight flutes, which then are shallow and separated by a sharp arris. The Ionic columns of southern mainland Greece (the Peloponnese) usually have only twenty flutes, with flattened arrises. There are different forms of base, principally that used in the eastern Greek area, and that developed in the fifth century BC in Athens, which eventually prevailed over the eastern form. The capital has two pairs of volutes or spirals, about two-thirds the diameter in height, one pair on the front of the column, the other on the back, and joined at the sides by a concave cushion, sometimes plain but usually ornamented with numerous flutes, fillets and beads. The volute scroll rests on an echinus, circular in plan, carved with an egg-and-dart moulding and resting on a bead moulding, usually with running palmettes where it disappears under the volutes (p.106). Above the volute scrolls is a shallow abacus. The Ionic capital presented difficulties at the corners of a rectangular building, and in such positions a canted angle volute was used (p.107). The four-fronted capital of Peloponnesian Ionic, as in the Order of the Temple at Bassae, is exceptional in Classical Greek architecture though it became increasingly common in the Hellenistic period.

The Ionic entablature (p.107) passed through various stages of development. As evolved in the eastern Greek area, it had only two main parts, architrave and cornice, the latter supported by a frieze of large dentils. It was therefore very light in relation to the columns, being as little as one-sixth of their height, though in some temples, such as the archaic temple of Artemis at Ephesus, it was increased by a high vertical-faced 'parapet' sima, with carved decoration as for a frieze. A high entablature, with frieze and dentils under the cornice, was first used about 340 BC (for the 'temenos' at Samothrace) but did not become general until well into the third century BC. The order was soon used on the mainland too, at first only in treasuries built at Delphi by eastern Greek cities (p.135B) or in unusual monuments such as the 'throne' (actually a decorated altar) at Amyclae near Sparta. In the fifth century BC it was adopted by the Athenians (who claimed Athens to be the mother city of the Ionians) for temples such as the Erechtheion (p.117) and the Temple of Athena Nikè, Athens (p.135A), which are the finest examples of the style. On the mainland, generally, a frieze was inserted in

the entablature, but the dentils were omitted. The Ionic architrave, normally with three fasciae, is capped by two mouldings, a low astragal and a high ovolo, until the time of Hermogenes. The frieze, when present, is often decorated with a continuous band of sculpture. Ionic temples do not have antefixae on the flanks; instead, the sima or gutter moulding of the raking cornices at the ends of the temple is carried along the side cornices, too, and is often ornamented with an acanthus scroll. Carved lion heads at intervals serve to throw rainwater from the roof.

The Corinthian Order

The Corinthian order made its first appearance in Greek architecture in the fifth century BC as a decorative variant of the Ionic, the difference lying almost entirely in the column capital. It was first used only for internal colonnades (Bassae, Epidaurus, the tholos at Delphi) or for fanciful monuments (the Choragic monument of Lysicrates, Athens). Its use in external colonnades was a Hellenistic development. The distinctive capital is much deeper than the Ionic and, though of variable height at first, settled down to a proportion of about one and one-third diameters high (p.109). Vitruvius records the fable (*De Architectura*, Bk. IV, Chap. i) that the invention of the capital was due to Callimachus, a famous Athenian sculptor in bronze, who obtained the idea from observing a basket over the grave of a Corinthian maiden, covered with a tile to protect the offerings it contained. Accidentally, the basket was placed over the root of an acanthus plant, the stems and foliage of which grew and turned into volutes at the angle of the tile. The perfected type has a deep, inverted bell, the lower part of which is surrounded by two tiers of eight acanthus leaves, and from between the leaves of the upper row rise eight caulicoli (caulis = stalk), each surmounted by a calyx from which emerge volutes or helices supporting the angles of the abacus and the central foliated ornaments. Each face of the moulded abacus is curved outwards to the corners, where it either ends in a point or is chamfered.

The Corinthian entablature is not distinguishable from the developed Ionic until the later Hellenistic period; in the earliest known instance of the order, in the Temple of Apollo Epicurius at Bassae, Corinthian and Ionic internal columns share the same entablature.

Evolution of the Orders

The developments which led to the evolution of the Classical Greek orders belong to the seventh century

(21) 20-V

BC. Larger temples were built, of more durable form and more interestingly decorated. The inspiration is probably to be sought in the cities of the Levant, with which the Greeks were now trading. The orders reflect the geographic divisions of the Greek world at that time, Doric evolving in the mainland communities, and Ionic in the eastern Greek area of the Aegean islands and the coast of Asia Minor. The structural improvements include the increasing use of stone in regularly trimmed blocks to form the bases of colonnades and walls, and the introduction of terracotta for tiles and revetments. These meant heavier roofs, which required the support either of stone walls or walls with massive timber framing. Woodwork therefore became more substantial and included external colonnades either in porches or completely surrounding the buildings. The plans of temples are similar in mainland and eastern Greek areas; it is the form of the columns and their entablature which distinguishes eastern Greek from mainland architecture. The eastern Greek versions (pp. 106, 107) are clearly related to Levantine prototypes, particularly the capital with two outward-turning volutes (the 'lily capitals', found in Jewish and Phoenician architecture long before they were introduced to Greece). Stone versions of this are not found in Greece until the sixth century BC; earlier examples may have existed in wood. There are two variants, that of the northern Aegean and coastal region (Aeolic), which is closer to the oriental prototype, the volutes rising from separate stems, and that of the southern Aegean, the Cyclades and adjacent coastal regions, where the volutes are linked (Ionic). The Aeolic style died out in the fifth century BC.

The origins of the Doric order are more obscure. It was probably developed in Dorian Corinth, which gives the order its name, though it was also the traditional architectural form in non-Dorian mainland cities, such as Athens. The capital echoes the Bronze Age type, though there is no evidence for the downward tapering shafts, and it is doubtful whether any Bronze Age columns survived at the time of the eighth and seventh centuries BC, except those stone examples on the facades of the Tholos tombs, of which, at least, the Treasury of Atreus was cleared and known at this time. The entablature with the triglyph and metope frieze reflects the pattern used to decorate prehistoric structures including the Treasury of Atreus—but similar patterns were used to decorate other objects, such as painted vases, and are found on ivory work made in Syria. Any of these may have been the inspiration of the Doric order. It is important to emphasise that the system is decorative, rather than structural in inspiration. These early decorative schemes were undoubtedly worked out in wood. The Temple of Poseidon at Isthmia, near Corinth, has stone walls (patterned to imitate a structure of wooden framing with brick infill) and a stone stylobate, but nothing survives of columns or entab-

lature, which were presumably wooden. There were terracotta tiles, arranged to form a hipped rather than a pedimented roof. This dates to the first half of the seventh century BC. The temple of Apollo at Thermon, of about 620 BC, had metopes of terracotta, with painted decoration, made in Corinth. In plan these early temples have a cella in the form of a megaron, with rectangular ends, and surrounded by a rectangular colonnade. Both mainland and eastern Greek examples (such as the early temple of Hera on the island of Samos) are long and narrow, and do not have the near square plans of the main room of the Bronze Age megaron, making it unlikely that there is a direct connection: the megaron plan still formed the traditional house type in Dark Age Greece.

The conversion of the Doric order from wood to stone took place towards the end of the seventh century BC. There is a contemporary stone Aeolic temple at Smyrna, which was destroyed, unfinished, in the last decade of the century. The earliest stone versions of Ionic are found in the island of Delos (the 'oikos of the Naxians', probably the first temple of Apollo there), which was embellished and improved in the early sixth century BC. The details of the Doric order clearly suggest the timber prototypes, particularly the series of strips under the projecting band at the top of the architrave, the regulae, with circular drops (guttae) beneath, surely reflecting the nails and pegs used to fix triglyphs and metopes in place. There are similar, but wider, blocks (mutules) fixed with pegs under the cornice, to secure the roof.

The earliest stone Doric temples are those of Athena at Delphi and Artemis at Corfu, of about 600 and 590 BC. The contemporary temple of Hera at Olympia still had mud-brick walls and timber columns, which were only gradually replaced in stone.

Sanctuaries and Temples

The Greeks recognised separate areas as sacred to a god, both in their towns and villages, and in the surrounding countryside. Some were on sites occupied in the late Bronze Age, where presumably visible remains of earlier walls, or even some continuity of cult, led to their selection for religious purposes. Others were chosen because of natural distinctions, such as the proximity of springs. In eastern Greece, certain low-lying sanctuaries (Hera on Samos, Artemis at Ephesus) were probably places used for cult practices inherited by the Greek settlers from earlier inhabitants. In towns some sanctuaries were in walled citadels, although in several Greek cities the major sanctuary was not in the town at all, but outside in the countryside (the sanctuaries of Hera at Argos and on Samos, for example). Unless they were on citadels, they were rarely walled, and formal gateways are surprisingly infrequent.

Even if it was not absolutely necessary to the

religious practice, all sanctuaries of any pretension included a temple. By the Classical period these temples varied in detail, though almost all consisted essentially of simple rectangular buildings to hold statues of gods. The statue stood in the cella or naos, the width of which was limited by the restricted sizes of roof timbers, though inner colonnades made wider rooms possible. The side walls usually extended forward to form the porch, so that the traditional megaron plan survives. Porches, in all but the smallest buildings, were embellished with columns, placed either between the ends of the side walls (in antis) or in a row in front of them (prostyle).

The conventional description of the numbers of columns consists of a Greek numeral plus the word 'style' (stylos, the Greek for column). Thus distyle (two columns), tetrastyle (four), hexastyle (six), octastyle (eight) and decastyle (ten). Odd numbers, three (tristyle), five (pentastyle), seven (heptastyle), nine (enneastyle) are unusual, and found chiefly in early buildings, of the sixth century BC. The commonest simple temples (apart from those which are mere unembellished rooms) are distyle in antis. The same terms are used for the numbers of columns forming the facade of peripteral temples, that is, those where the cella is surrounded by columns. In such temples the number of columns along the flanks is variable. In Doric temples of the fifth century BC the number on the flank usually is twice the number on the facade plus one, but the length of a temple reflects its internal arrangements, where there may be extra rooms, or false porches at the back.

Externally, temples might be made larger and more impressive by using double rows of external columns (dipteral) or even three rows (tripteral) along each end. The outer colonnade might be spaced as though there were a second, internal row which is in fact omitted (pseudodipteral). Colonnaded false porches in non-peripteral temples are rare and restricted to prostyle examples; they are called amphiprostyle and are either tetrastyle (the temple of Athena Nikè on the Athenian Acropolis) or hexastyle (the fourth century BC temple of Athena, Delphi).

Sanctuaries might well contain more than one temple and include those of lesser importance than the principal building (such as the temples of Artemis in the sanctuary of Asklepios at Epidaurus), or temples constructed at different periods, but apparently of equal importance (as at Selinus in Sicily). Altars were often monumental, generally rectangular and embellished with architectural motifs and mouldings such as triglyph-and-metope friezes, or screens of columns. All sanctuaries had altars, even if there was no temple. In sanctuaries which commanded the support of all Greek cities (Zeus at Olympia, Apollo at Delphi) individual cities might offer to the god a building resembling a small non-peripteral temple, termed a 'treasury' (thesauros); these were not mere

storage places but offerings in their own right, often lavishly decorated with sculpture, and generally commemorating some important event, such as a victory in war (the Athenian treasury at Delphi) or the discovery of a rich vein of silver (the treasury of the Siphnians, also at Delphi). Buildings may have been peculiar to a particular cult. For example Asklepios at Epidaurus (who was regarded as a mortal who became deified) had a circular building, the Thymele, which may have served as a cenotaph; in Greek architecture circular buildings are never temples, but serve commemorative purposes. The tholos at Delphi and the Philippeion at Olympia are other examples. All were decorated with Corinthian colonnades internally. There was also a building for the healing ritual of incubation, the abaton, where patients would pass the night in the sanctuary in the hope of a miraculous visit from the god. Most sanctuaries became full of monuments, statues and other offerings, often placed on elaborate high bases, and exhedrae, rectangular or semicircular seats and recesses. In many sanctuaries it is possible to distinguish between the most sacred area near to the temple and altar and the other, less holy area devoted to the human involvement in cult and ritual. In these outer areas are to be found buildings such as a theatre for the religious dramatic festivals, the stadium and hippodrome for athletic contests and chariot racing, and exercise grounds, palaestrai and gymnasia (often attached to or close to a stadium). There may also be special buildings for the sacred banquets, in which privileged worshippers consumed their share of the sacrificial meat, while reclining on couches in the Greek manner.

The Acropolis at Athens (p.110) is the supreme example of a Greek sanctuary. It was originally a Late Bronze Age citadel, with massive fortifications similar to those at Tiryns and Mycenae, and with a western entrance gate flanked by a projecting bastion like the Lion gate at Mycenae (q.v.). These fortifications remained in use until the sixth century BC. On the summit there was undoubtedly a palace, destroyed presumably early in the Dark Age. Nothing more is known until the eighth century BC, by which time there was an altar on its highest point, and possibly a simple nondescript temple to Athena. The temple was rebuilt and improved on several occasions. The core of it became a double cella, one part facing east, the other, an anteroom, facing west, with two side-by-side inner rooms. There were tetrastyle prostyle porches at each end, and, probably not later than the later seventh century BC, a peripteral colonnade in the Doric order. This temple (the 'old temple') was finally rebuilt, with the same plan, in about 525 BC, but this was burnt by the Persians in 480 BC. The west cella was then patched up as a storeroom and parts of the entablature were set into the renewed north wall of the Acropolis, probably as a war memorial.

Early in the fifth century BC (perhaps to celebrate the victory at Marathon in 490) it was decided to add new buildings to the Acropolis. The old Bronze Age gateway was demolished, and a new propylon designed to replace it. It was H-shaped in plan, possibly with five doors in the cross-wall and four columns in antis to each facade, the antae being formed by returns along front and back from the side walls. To the south of the 'old temple' a larger Doric temple, also to be dedicated to Athena, was begun, but this too was burnt, unfinished, by the Persians.

The Athenians merely tidied up the ruins when the Persians withdrew. Only when the Persians were forced to accept peace in 449 BC was the work renewed. The old propylon was replaced by a more complex structure called the *Propylaea* (a plural term, indicating that it is more than a simple propylon entrance) (p.113), the architect of which was Mnesicles. Its central element is again an H-shaped gateway building, now turned so that it is on the east-west axis of the Acropolis. The inner hall is at a higher level, and the cross-wall, with five doors, is closer to the back. It is preceded by a flight of seven steps, except to the central (and largest) door, through which passes a continuous slope, providing access for processions and sacrificial animals. Both facades are Doric hexastyle prostyle. Inner and outer halls had different roof levels. The roof of the outer hall was supported by two rows of three Ionic columns, flanking the central passageway. The ceiling was of marble (as was the rest of the structure except for contrasting elements in Eleusinian limestone) with gilded stars in the coffer squares. The outer facade is flanked by two wings, placed against walls which run out from the sides of the main hall to north and south. Both are tristyle in antis with Doric columns smaller than those of the main gate halls. Behind the north wing is a rectangular room, the front wall of which has an off-centre door with flanking windows. This indicates that the room had couches placed around the walls and functioned as a formal dining room. The walls were decorated with panel paintings, which give it the name of Pinacotheca, picture gallery. The south wing was truncated and had only a wall behind its colonnade. It corresponds to a similar-shaped area which flanked the earlier propylon, and gave access to the Nikè Bastion.

An interesting feature of Mnesicles' *Propylaea* is the way in which it was built up from separate building masses, each with its own roof line—the two wings on the west front, the outer entrance hall and the inner entrance hall—and the manner in which the separate elements of the earlier arrangement (gate house, dining room, inner rooms and L-shaped area) were now assembled into a more coherent composition. The *Propylaea* was started in 436 BC and left incomplete on the outbreak of the Peloponnesian War in 431 BC.

The main building on the Acropolis is the revived

large temple to Athena, the *Parthenon*, started in 447 BC and completed in 436 BC (pp.102, A.B.H. 114, 115). The existing massive south foundations were re-used, but the temple was made wider by extending it towards the centre of the Acropolis. The facade was now given eight, rather than six, columns, while there were seventeen along the flanks, the approved fifth-century ratio. The architects were Ictinus and Callicrates: it is not known how the work was shared between them. Phidias was the master sculptor, and may have been responsible for general supervision of the work on the Acropolis.

The temple stands on the conventional three steps, below which the foundation platform originally created for its predecessor remained visible on the west, south and east sides of the building. Dimensions at the top step are 30.9 m × 69.5 m (101 ft × 228 ft). The steps, with a height of 508 mm (20 in), were too high to use, so intermediate steps were provided at the centre of each of the short sides. The cella consisted of two rooms end to end with hexastyle prostyle porches. The eastern room was 29.8 m long by 19.2 m wide (98 ft × 63 ft), with internal Doric colonnades in two tiers, structurally necessary to support the roof timbers. Inside the colonnades, towards the end, there stood the gold and ivory statue of Athena Parthenos, the work of Phidias, representing Athena fully armed with spear, helmet, aegis and shield, accompanied by a snake, and holding in her extended right arm a statue of victory. The ceiling was of wood, with painted and gilded decoration. Light was admitted, as normally in Greek temples, only through the doorway when the great doors were opened. To the west, with its own porch, was a square chamber, the *Parthenon* or Virgin's chamber, a depository for valuable offerings. Here the roof was probably supported by a group of four Ionic columns. The spaces between the antae and porch columns, at either end, were closed by metal grilles.

On the exterior, the Doric columns measure 1.9 m (6 ft 2 in) in diameter and are 10.4 m (34 ft 3 in) high, approximately $5\frac{1}{2}$ times the diameter. The corner columns are slightly larger in diameter, with their spacing reduced to make it possible for the frieze to conform to the rule that it must terminate with a triglyph.

The *Parthenon* is the best example in Greek temple architecture of the practice of optical refinement. Apart from the entasis on the columns, the long, horizontal lines of such features as stylobates, architraves and cornices, which, if straight in reality, would have appeared to the Greek eye to sag or drop in the middle of their length, were formed with slightly convex outlines. In the *Parthenon*, the stylobate has an upward curvature towards its centre of 60 mm ($2\frac{3}{8}$ in) on the east and west ends, and of 110 mm ($4\frac{1}{16}$ in) on the sides. Vertical features were also inclined inwards towards the top to correct the appearance of falling outwards; thus the axes of the

corner columns lean inwards 60 mm (2 3/8 in) and the axes of the columns, if extended upwards, would meet at a distance of 2.4 km (1 1/2 miles) above the stylobate. The joints of the marble roof tiles above the cornice were marked by carved antefixae, which formed an ornamental cresting along the sides of the building. There were no gutters except over the pediments, with short returns along each side decorated with false (unpierced) lion's head spouts. Below the colonnades, the coffered ceilings, of marble, were supported on marble beams. The pediments had large floral acroteria at the apex and lower angles. The sculptural decoration of the eastern pediment represented the birth of Athena, that of the western one the contest of Athena and Poseidon for the patronage of Athens. The carved decoration was exceptionally lavish. All the metopes, totalling ninety-two, were decorated in deep relief, depicting scenes of combat: there were gods and giants on the east facade, Greeks and Amazons on the west, Centaurs on the south, and battles of the Trojan war on the north. All symbolise allegorically the successful struggle of the Greeks against the Persians. Though the porch architraves had the regulae and guttae which normally occur under a Doric frieze, the frieze was in fact continuous in the Ionic style, in low relief. It is a masterpiece of design and execution and depicts a procession, with the gods seated in their home on Mount Olympus.

In the late sixth century the Parthenon was converted into a Christian church, dedicated to Divine Wisdom, thus perpetuating an attribute of Athena. An apse was formed at the eastern end, damaging the sculpture. From about 1204, under the Frankish Dukes of Athens, it served as a Latin church, until in 1458 it was converted by the Turkish conquerors into a mosque. During the siege of Athens by the Venetians in 1687 a powder store exploded causing considerable damage; fortunately drawings had been made of the sculpture which survived before the explosion. The north colonnade was restored in 1921-9, but the use of steel reinforcements, which have rusted, and the general atmospheric pollution of modern Athens, have necessitated a new and massive programme of conservation.

The other temples on the Acropolis are Ionic. The **Temple of Athena Nikè** (Nikè Apteros) (pp.110, 113H, 135A) stands on the bastion outside the Propylaea. It is tetrastyle amphiprostyle, with a continuous frieze and no dentils, and measures only 8.2 m x 5.4 m (27 ft x 17 ft 9 in). There is no conventional porch: the front of the cella has two rectangular piers between the antae which are closed by grilles instead of a wall with a door. More space for a conventional porch could have been obtained by omitting the rear colonnade; but this end, facing west, is the one that was visible on approaching the Acropolis. The temple was apparently designed by Calli- crates, shortly after 450 BC, but not built until 424

BC. Subsequently, the temple was surrounded by a balustrade on the north, west and south sides of the bastion.

The second temple, the **Erechtheion** (pp.110, 117, 118, 119A,B), was the replacement for the 'old' temple, and housed that temple's venerable wooden cult statue of Athena, which had been evacuated to Salamis at the time of the Persian invasion. There are three possible reasons why the new temple was not placed on the foundations of the old, but moved to an adjacent site immediately to the north: first that it was not considered proper to rebuild a dedicated temple destroyed by the barbarians; secondly that moving the temple to the north gave a better balance with the larger and wider Parthenon to the south; or thirdly that it was desired to incorporate under the protection of the new structure a number of monuments and sacred places. These included the salt pool (which had appeared at the spot where Poseidon had struck the acropolis with his trident) and the shrine of Erechtheus, the legendary king of Athens which was to give the new temple its 'popular' name. The resulting building is unusual and irregular in plan, but shows the same principles as those employed in the layout of the Propylaea, namely the gathering together of several elements into a complex but united arrangement. It is more likely that this was done deliberately, on the inspiration of the Propylaea, rather than that an original plan, similar to the 'old' temple, was gradually modified. The original architect is not known (inscriptions record only later building supervisors) and if he were not Mnesicles himself, he certainly had learned from Mnesicles. The temple was begun perhaps in 421 BC, and completed in 406 BC.

The site is not flat, but because of the sacred places there it was impossible to level it up by terracing. The cella is built on two levels, the eastern part at the higher, the western part at the lower. As in the old temple, the western contained an anteroom and two inner rooms placed side by side. The east porch, at the higher level, is hexastyle prostyle with columns 6.586 m (21 ft 7 in) high. The entablature, which has a continuous frieze in dark limestone with attached marble figures, extends along the sides of the cella, and across the west end. This ensured that the west columns were similar in size to the east, and they therefore form a screen above a section of wall which descends to the lower level and not a ground level porch.

The eastern cella is entered through a door, flanked, most unusually for a temple, by windows. The divisions of the western cella do not seem to have risen above the level of the wall on which the screen stands, and all parts of it were illuminated therefore by the light admitted through the openings between the columns. At the west end of the south side a low porch projected at the higher ground level, the only part of the new temple to rest on foundations of the

old. This consisted not of columns but of statues of young girls, the Maidens, of which there are four in front and another behind each of the corner figures. The term Caryatid, often used for the figures, should not properly be applied to it. The maidens stand on a low wall, with an opening between the eastern rear figure and the main cella wall, through which an angled stair led to the anteroom. The entablature incongruously resting on the maidens' heads is Ionic but has a dentil frieze, and supports a roof of flat slabs. Opposite is the great north porch at the lower ground level, similar in plan but with Ionic columns 7.6 m (25 ft) high; the west side of it, unlike the south porch, is not aligned with the west wall, but is placed still further to the west. This makes it possible for the porch to have two doors, a main central door, with elaborate Ionic details to its jambs and lintel, and a smaller door to the west which leads to the sanctuary of Pandrosus; this extended in front of the west end of the Erechtheion, at the lower level, and contained the sacred olive tree given by Athena to the Athenians during her contest with Poseidon; it was destroyed by the Persians but miraculously sprang to life again on their departure. This extension of the porch abuts very awkwardly against the decorated capital of the north-west anta to the main cella block. The north porch, like the main building, had a continuous frieze of dark limestone with attached white figures. Under the floor of the north porch are the marks where Poseidon's trident struck the rock, and above them an opening in the roof, presumably to avoid damaging the building should Poseidon choose to repeat the performance. Another awkwardness was caused by the tomb of Kekrops, a hero-king of Athens, under the south-west corner, which made it impossible to build either foundations or the lower part of the wall. But the design difficulties cannot detract from the superlative effects of delightful decoration and exquisite workmanship.

The temple suffered a severe fire in the first century BC, but was repaired. After the usual vicissitudes, the remains were cleared during the nineteenth century, and reconstructed. These reconstructions have proved unstable, and the Erechtheion has been largely dismantled and is in course of reconstruction. The maidens (except one taken by Elgin) have suffered grievously in the pollution and acid rain of the modern city, and have been removed and replaced on the monument itself by casts.

Other buildings on the Acropolis are less well-preserved. They include, near the Propylaea, the separate Sanctuary of Artemis, an offshoot of her rural cult at Brauron. Between this and the Parthenon was the Chalkotheke, or armoury, consisting of a forecourt and a Doric stoa with a very large single room behind. Here were deposited the suits of bronze armour required from Athens' subject allies (theoretically her colonies) as offerings to Athena at her festival. Other buildings were less significant:

they included, on the north side of the Acropolis, the room where the maiden priestesses of Athena, the Arrephoroi, dwelt during their period of office.

Besides Olympia (p.121), Delphi (p.122) and Epidauros, which have already been mentioned, other important sanctuaries on the mainland include those of Hera at Argos, and the remote oracular sanctuary of Zeus at Dodona in north-west Greece. In the eastern Greek area are the great Ionic sanctuaries of Hera on Samos, Artemis at Ephesus, and Apollo at Didyma in the territory of Miletus.

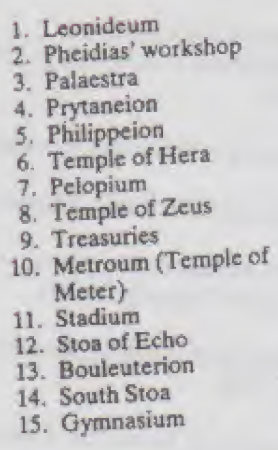
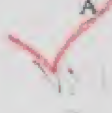
Two rather different sanctuaries are those of Demeter and Kore at Eleusis, near Athens, and that of the Kabeiroi (originally Thracian deities) on the island of Samothrace in the north Aegean. At Eleusis there was a large roofed hall, the Telesterion, in which a secret ritual could be conducted away from profane eyes. These are the only buildings in Greek sanctuaries which are congregational in character.

Other Doric Temples

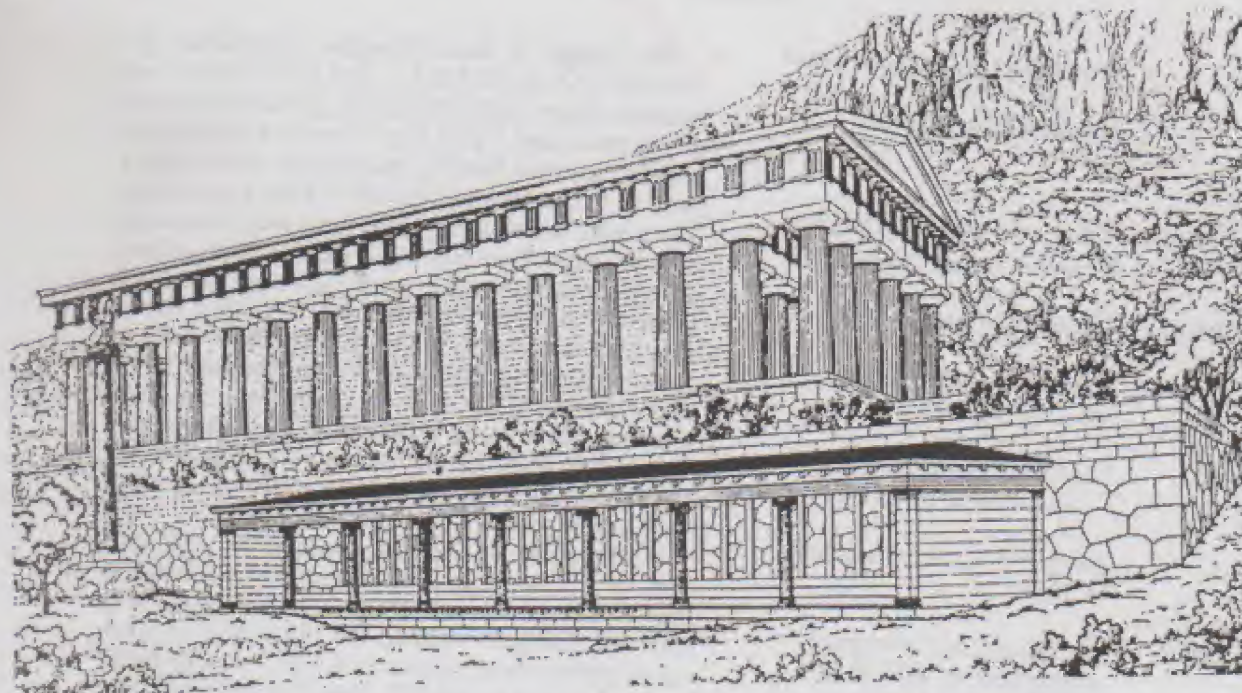
The principal Doric temples were in Greece, Sicily and southern Italy. Except for the Parthenon, which has been described already, they are listed below:

DORIC TEMPLES IN GREECE

c. 590 BC	The Heraion, Olympia (pp.121, 126C,F)
c. 540 BC	Temple of Apollo, Corinth
c. 510 BC	Temple of Apollo, Delphi (p.122)
c. 500 BC	Temple of Aphaia, Aegina (pp.124, 125)
c. 460 BC	Temple of Zeus, Olympia (pp.121, 136A)
begun 449 BC	Temple of Hephaestus ('Theseion'), Athens (pp.119C, 128)
444-440 BC	Temple of Poseidon, Sounion
435-432 BC	Temple of Nemesis, Rhamnus
426 BC	The Athenian Temple to Apollo, Delos (p.103G)
c. 425 BC onwards	Temple of Apollo Epicurius, (p.129)
c. 370 BC	Temple of Asklepios, Epidauros

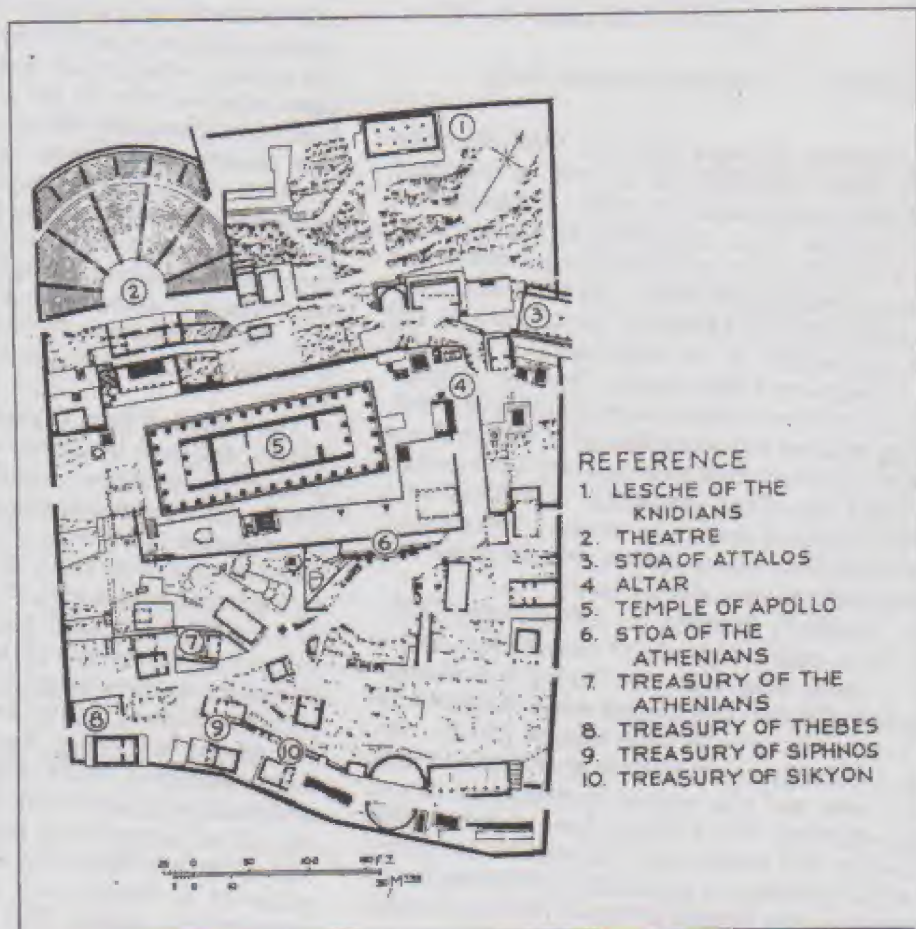


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A. Delphi, Athenian stoa. Behind it, the polygonal wall and temple of Apollo VI (c. 510 BC). See p.120

B. Delphi: plan of temenos (c. 150 BC) (reconstruction by P. de la Coste-Messelière)



after 350 BC Temple of Athena Alea, Tegea

c. 336 BC Temple of Zeus, Nemea

DORIC TEMPLES IN SICILY AND SOUTHERN ITALY

c. 565 BC Temple of Apollo, Syracuse

c. 550–530 BC Temple 'C', Selinus

c. 530 BC The 'Basilica', Paestum
(pp.126E,H, 130K)

c. 520–450 BC The Great Temple of Apollo
(G.T.), Selinus (p.130L)

c. 510 BC Temple of 'Ceres', Paestum
(p.103B)

c. 510–409 BC Temple of Zeus Olympius,
Agrigento (p.126J,K,L)

480 BC Temple of Athena, Syracuse

c. 460 BC Temple of 'Neptune', Paestum
(pp.103C, 126A,B,D,G, 127)

c. 424–416 BC Temple of Segesta, Sicily

The Heraion, Olympia (pp.121, 126C,F), dedicated to Hera, illustrates the process of transition from timber construction to stone. It stands on a platform of two steps, measuring 51.2 m × 19.6 m (168 ft × 64 ft 6 in). As usual with early temples, it is long in proportion to its width. The thick naos walls are of ashlar stone to a height of 1.1 m (3 ft 6 in), but all the upper parts of the walls were of sun-dried brick, strengthened with wooden framing. Both internal and external columns were originally of wood, but were replaced with stone from time to time over a period of centuries. Thus they vary very much in their details and are either monolithic or built-up in a varying number of courses or 'drums'. The entablature remained always of timber, and the antae and the door casings were also of wood.

The 'Basilica', Paestum (c. 530 BC) (pp.130K, 126E,H), in reality a temple of Argive Hera, is unusual in being enneastyle, the central line of eight columns in the naos dividing the width of the temple into four parts and providing support for the roof timbers. For this reason too, the ambulatory is wide at the sides and the temple consequently almost pseudo-dipteral. The columns have a pronounced diminution and entasis, and the capitals are heavy and wide-spreading. A peculiarity of this temple and the neighbouring Temple of 'Ceres' (in fact, Athena) (c. 510 BC) is the decorative treatment of the trachelion, which shows Ionic influence.

The Temple of Zeus Olympius, Agrigento (c. 510–409 BC) (p.126J,K,L), also is of unique and freakish design, with a heptastyle, pseudo-peripteral arrangement and a plan with a central naos and two slightly narrower flanking apartments. At the west a portion of the naos was cut off to form a sanctuary. The temple is now a ruin. That there were pediments over the ends of the building is clear from an ancient description and from surviving fragments. The enormous attached, external columns, 4 m (13 ft 3 in) in diameter and over 17 m (56 ft) high, show traces of Ionic influence with mouldings across the base. In the upper portion of the screen wall, between the outer columns, were giant 'Atlantes', sculptured figures 7.6 m (25 ft) high, giving intermediate support to the massive entablature. The coarse stone was finished with a thin coating of fine marble stucco.

The Temple of Aphaia, Aegina (c. 500 BC) (pp.124, 125), on an island about 40 km (25 miles) from Athens, is one of a group of temples in the area of the Saronic gulf—namely the 'old temple' of Athena at Athens (final version, c. 525 BC), Apollo at the town of Aegina (c. 510 BC), Poseidon at Calauria, on the island of Poros, and Poseidon at Hermione—which have proportions, width to length, of about 1:2 only. The Temple of Aphaia is hexastyle, but has only twelve flanking columns with a double range of interior columns separated simply by an architrave. All exterior columns had monolithic shafts, except three adjacent ones on the north side, which were built up in drums after the naos had been completed. The pediment sculptures, the elaborately carved acroteria, the antefixae, and the roof slabs over the pediments and eaves were in Parian marble; the rest of the roof tiles were of terracotta. The pediments contained remarkable sculptures belonging to the latest phase of archaic Greek art dating from c. 500 BC, like the temple itself. Most of the temple was of local limestone, usually treated with a coat of marble stucco.

The Temple of Zeus, Olympia (c. 470 BC) (pp.121, 136A), designed by Libon of Elis, belongs to the phase of the developed, mainland temples of the fifth century BC. Continuity of pattern and formal organisation were achieved in what is arguably the finest manifestation of the Doric temple. It was orthodox in arrangement but grand in its dimensions—27.7 m × 62.3 m (90 ft 9 in × 204 ft 4 in) over the stylobate—as befitted the supremacy of the god and the location. Its ratios—column height to spacing 2:1—are simpler than those of the Parthenon, and in comparison the order is very heavy. Again it was built mostly of coarse limestone, faced with marble stucco, but the sculptured pediments were of Parian marble, as were the carved metopes over the inner porches, the sima and all the roof slabs. The sculpture of the pediment achieved a serenity and composure of supreme monumental quality. The external metopes, however, were not carved. About 431 BC the temple

ated: it is 611 mm (24 in) high and 30.5 m (100 ft) long and represents battles of Centaurs and Lapiths, and Greeks and Amazons.

The **Temple of Asklepios at Epidaurus** was paid for by subscriptions collected throughout Greece for a cult which only developed in the fifth century BC, and then gained rapid and intense popularity. It was completed about 370 BC, and is interesting for the complete preservation, on an inscription, of the building contract. Externally it was conventional and rather dull, had 6×11 columns, and was built of limestone. There was no rear porch. None of the superstructure is standing.

The design of the **Temple of Athena Alea at Tegea** (c. 350 BC) is attributed to the fourth-century sculptor Scopas. It is built of marble, and its proportions recall those of its predecessor, destroyed in 384 BC.

The **Temple of Zeus at Nemea** was built some ten years later and also replaces an earlier building. It has 6×12 columns, six and three-eighths diameters in height, with very small capitals. It is built of poros limestone, and has free-standing internal Corinthian colonnades.

Other Ionic Temples

The principal examples of the Ionic Order were in Asia Minor and on the Greek mainland. Except for those already described they are listed below.

IONIC TEMPLES IN ASIA MINOR

c. 560 BC	Archaic Temple of Artemis, Ephesus (pp.107A, 133)
c. 575 BC	Temple of Hera, Samos
c. 356 BC	Later Temple of Artemis, Ephesus (p.133)
c. 334 BC	Temple of Athena Polias, Priene (p.107F)

IONIC TEMPLES IN GREECE

c. 449 BC	Temple on the Ilissus, Athens (Temple of Artemis Agrotera) (p.135A-F)
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The **Temple of Hera, Samos**, an early peristyle temple, was first established at Samos in the seventh century BC, if not earlier, but was replaced by the sixth-century temple by the architect Rhoikos. It was dipteral octastyle, though the rear facade contained ten columns and had a deep portico. Scarcely finished, the building was destroyed by fire and replaced (c. 525 BC) by another, larger building measuring $54.6 \text{ m} \times 112.2 \text{ m}$ (179 ft \times 368 ft). The portico was

octastyle, the rear facade had nine columns (enneastyle), and the double peristyle rows of twenty-four columns. The end colonnades were built with a third row of columns, making them tripteral. The colossal building was never completed.

The later **Temple of Artemis, Ephesus** (p.133), was the fifth in succession to stand upon this famous site. The earliest had been relatively small; the immediate predecessor, the 'Archaic' temple (c. 560 BC), was burnt down in 356 BC and built anew in still more magnificent style, but on the same foundations and to an identical plan. The only substantial differences between the old and the new were in the details and the fact that the later temple stood on a platform of steps, about 2.7 m (9 ft) high, instead of a two-step crepidoma, as formerly. Yet owing to the scanty remains there are uncertainties about the arrangement of the plan, and several somewhat different restorations have been proposed. The temple was dipteral, octastyle at the front but perhaps enneastyle at the rear as at Samos. The object of an extra rear column would be to evade the serious difficulties of spanning the exceptionally wide central intercolumniation which, although preferred and traditional at the front, was not essential at the rear. The column spacings on the main front were progressively less wide from the centre outwards to the corners. The central span was more than 8.5 m (28 ft) and needed a marble architrave beam about 1.2 m (4 ft) deep. The temple was grand in its dimensions, though not the largest in Ionia. The entablature was relatively shallow, being of the usual Asiatic type, comprising architrave and dentilled cornice but no frieze. Equally characteristic are the deep pronaos with several pairs of columns within it, and the shallow opisthodomos which was probably absent in the archaic temple. It has been argued plausibly that the cella in both old and new temples was not roofed. About the internal arrangements of this temple, nothing is definitely known. The orientation is unusual, as for traditional reasons on this site the temple faced west instead of east. There were 117 columns altogether (interpretations differ), thirty-six of which bore sculptures on their lower parts. The preceding temple had similar sculptures, and fragments from both periods, along with pieces of corresponding capitals and shafts, make it possible to compare the early and late work at Ephesus (p.107A,E). The building of the later temple extended well into the Hellenistic period. Like its predecessor, it ranked as one of the seven wonders of the Ancient World. The original designers were Demetrius and Paeonius of Ephesus, and probably Deinocrates. Famous sculptors, particularly Scopas, were employed in its decoration.

The **Temple of Athena Polias, Priene** (p.107F), is finely proportioned but more modest in plan and scale. Pythius, the architect, wrote a book about it. The plan is peripteral, $19.5 \text{ m} \times 37 \text{ m}$ (64 ft \times 122 ft) over the stylobate, with a hexastyle front and eleven

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columns on the sides, almost twice as long as it is broad. There is a broad pronaos and shallow opisthodomos, while the column bases have the now usual plinth. The two-part entablature still omitted the frieze. The colonnade was placed close to the cella walls, and the ceiling comprised a single row of large coffers carefully designed to take account of the foreshortened view from underneath.

The Temple on the Ilissus, Athens (p.135), an amphiprostyle tetrastyle small temple, of Pentelic marble, measured about 6.1 m × 12.8 m (20 ft × 42 ft) over a three-step crepidoma. It was dedicated to Artemis Agrotera. It was similar to the temple of Athena Nikè on the Acropolis, but was built earlier—perhaps around 449 BC. It had a proper porch, however, with two columns in antis. It was converted into a church and was drawn and measured in the eighteenth century by Stuart and Revett, but was subsequently destroyed.

The Temple of Apollo, Didyma, near Miletus, was built in the late sixth century BC and destroyed by the Persians in 494 BC. Like Ephesus, its cella seems to have been unroofed. It was later rebuilt, to a similar plan, but enlarged somewhat and on a slightly different alignment: the later temple is described in Chapter 6.

Urban Architecture

Classical Greek cities were either the result of continuous growth, extending from prehistoric times through the Dark Age and Archaic periods, or created at a single moment, usually as the result of colonial settlement. The former had streets which followed lines of communication, curving and bending where necessary to avoid obstacles or to ease gradients; the latter generally had grid plans, with straight streets crossing at right angles, ignoring obstacles and becoming stairways where the gradients were too steep. Despite these differences, certain features and principles of arrangement are common to both.

Towns always had fixed boundaries. Already in the sixth century BC some were surrounded by fortifications, and these later became more frequent, but even where there were no walls the demarcation between interior and exterior was clear. There might be buildings such as temples outside, and, except for very privileged individuals, graves were always outside, often lining the roads that led away from the town. At times there were suburban houses, or rural farmhouses, but generally the Greeks preferred the safety and companionship of urban settlements, in villages if not in the principal cities.

In most Greek towns much of the available area was devoted to public rather than private use. The important gathering place was the agora, which was

placed conveniently for communication, on flat ground and as easily accessible as possible from all directions. Coastal cities, such as Samos or Thasos, tended to place the agora by the harbour, for obvious reasons; otherwise it was sited in the centre.

The Agora of Athens (p.136C) was situated on low-lying damp ground to the north of the Acropolis, which had been incorporated in the city in the early Archaic period. An essential stage in its development as the civic centre was the provision of effective drainage by the tyrant Peisistratos in the second half of the sixth century BC. The drain, built in superb polygonal masonry, runs near the western boundary of the agora. Civic and religious buildings were erected progressively around its perimeter. Most of those of the sixth century BC were architecturally nondescript, and were destroyed by the Persians in 479 BC. The sole survivor was the tiny Stoa of the King (stoa Basileia), a Doric building measuring 17.7 m × 7.2 m (58 ft × 23 ft 6 in) in which the Basileus (the king, elected annually in historical Athens) performed his official duties, which were religious and judicial.

Stoas proved useful buildings in the context of the agora. They provided shelter, and served many purposes, especially when they included rooms behind the colonnade. In addition, they were a way of embellishing the boundary of the agora, looking in towards the open space. Though early examples are separate, self-contained buildings, in time they came to give the agora the appearance of a colonnaded courtyard. More of them were built at Athens after the defeat of the Persians. On the north side the Painted Stoa, like the stoa of the King, was a simple colonnade between side walls, closed at the back, and with an inner colonnade to support the ridge. It housed a famous series of panel paintings depicting the victory of Marathon, and glorifying the role of Miltiades, father of the politician Cimon on whose behalf it was built in the 460s. Another Doric stoa, on the west side of the agora, the Stoa of Zeus, is a work of the later fifth century BC. This has two aisles, with projecting wings. The inner colonnade was Ionic. The aim seems to have been to echo the architecture and appearance of the temple of Hephaestus, standing on the nearby hill, the Kolonos Agoraios. Ionic columns were general for inner colonnades of stoas because they gave greater height, and supported, at much wider intervals, not a stone architrave, but the wooden ridge beam. Single-storey stoas did not normally have ceilings.

The third important stoa of the Classical agora at Athens, was placed on the southern boundary late in the fifth century BC. It measured 80.5 m × 14.9 m (264 ft × 49 ft), had a Doric colonnade, details of which are lost, and an inner colonnade, probably at double intervals and presumably Ionic. Behind the colonnades was a row of fifteen rooms each 4.9 metres (16 ft) square, with off-centre doors and

plinths round the walls to accommodate seven dining couches. The superstructure was of mud brick, the floors in rooms and colonnades were of beaten earth. Such cheaper forms of construction are frequently found in stoas and mean that they are rarely well preserved.

Other administrative buildings provided closed accommodation. On the west side were the **Bouleuterion** or council house and the **Tholos**. The council house held five hundred councillors who met in closed session. The original building was square, probably with windows set high in plain walls. The roof was pyramidal. The building was divided internally into an anteroom and an auditorium, which probably had straight rows of seats at its side and across the back. The Bouleuterion dates to the early part of the fifth century BC, and was replaced at the end of the century by a rectangular building with a ridged roof, in which the auditorium had seats arranged in a nearly circular plan. Nothing but foundations of these buildings remains.

The Tholos was, as its name implies, a circular building. Though an official structure, its walls were of unbaked mud brick. The standing committee of the council, the **prytaneis**, when in office dined in this building at state expense. It is not certain how the fifty dining couches were arranged in a circular structure, but they were probably extended into the centre, and the roof supports (which were of wood) were arranged not, as might be expected, in a circle, but in an ellipse. The roof itself was conical, with scale-like tiles. It was built about 465 BC.

Two courtyard structures by the agora were the **Heliaea** (the meeting place of the jury court) on the south side, and, to the east, the **Shrine of Theseus**, a walled enclosure where Cimon buried the alleged bones of the legendary founder of Athens which he had unearthed on the island of Skyros in 472 BC. It must have been partly roofed (probably a peristyle court) for it contained famous wall paintings which would need to be sheltered.

Other colonnaded structures on the south side of the agora were the **fountain houses**, where a portico protected people drawing water, and kept the water cool. There were also other shrines (of Apollo Patroos and Hekate, for instance) and public buildings, such as the mint.

Generally speaking, the central area of the agora was free of buildings, but a long monument to the heroes who gave their names to Clisthenes' new tribes was placed near the great drain facing the old Bouleuterion; and there was, towards the north, a precinct fence (rather than a wall) surrounding an altar dedicated to the twelve Olympian gods. The agora of Athens is the most thoroughly excavated and so best known from the Classical period, and it is likely to be typical of those found in unplanned cities. That at Argos included a stoa with three wings, facing outwards to the north, east and west, and probably

dating from the early fourth century BC.

Other public buildings in Classical Greek cities included gymnasia and stadia, and places for watching dramatic and related performances, which were generally part of religious ritual and, as we have seen, normally attached to sanctuaries. In the Classical period these were rarely monumental, though they began to develop in the fourth century BC; a discussion of them can be found in Chapter 6.

Private houses became more substantial in the Classical period, and were normally of the courtyard type. Literary sources refer to stone colonnades in the houses of the well-to-do, but wood was the normal material. Walls were of masonry or mud brick. The arrangement of rooms was generally asymmetrical. Two storeys were common, both in town houses and the few known rural houses. Typical Athenian examples are the houses excavated in the area immediately south of the agora; they vary surprisingly in plan, and are obviously responding to the often irregular shapes of their sites. More regular, because it was built at an unrestricted site, is the rural **Dema house** of about 420 BC, a farm building where the courtyard was essentially a forecourt with a high outer wall: the principal rooms were arranged in two storeys along the opposite side. Ground-floor rooms included formal dining rooms (**andrones**). Entrance to all these houses was, wherever possible, indirect, so that it was not possible to see into the courtyard from outside.

The most extensive series of houses of the Classical period are those excavated at the north Aegean town of **Olynthus**, which developed considerably in the late fifth and early fourth centuries BC; a new area was laid out in a regular grid plan. Here each house was allotted a regular square building plot, within which the owner could build as he pleased, so that no two plans are alike, though all include courtyards and have the principal rooms on the north side, facing south (for shelter against the cold Balkan winds of winter). Otherwise, there is no distinction here from the arrangements at Athens, or from the courtyard houses which have been discovered at the west Greek cities, such as Himera in Sicily.

Classical tombs were not usually monumental. Those at Athens are often grouped in family precincts (**periboloi**), which may include walled banks, rectangular or, in rare instances, circular, into which the ashes of the dead were deposited. On these mounds were erected markers, which in the fifth century BC were narrow upright slabs, perhaps surmounted by an acroterion, while those of the fourth century BC became wider, were decorated with sculpture (a tradition which descended from the Parthenon workshops) and were surrounded with a quasi-architectural frame.

Monumental tombs belonged to foreign dynasts, such as the rulers of the Lycian cities in southern Asia Minor or (the most famous of all) Mausolus, Ruler of

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Caria, a non-Greek region in the vicinity of Miletus. By the fourth century BC the proximity of important Greek cities had led to the gradual Hellenisation of the adjacent non-Greek communities. Mausolus became powerful in the second quarter of the fourth century BC, dominating the neighbouring Greek cities. He made Halicarnassus his capital and re-planned it. When he died in 353 BC his tomb, the **Mausoleum**, was constructed in the city itself by his widow Artemisia. It stood in an open precinct on the slopes above the centre of the town, and was built from white marble. It consisted of a high rectangular podium, containing the burial chamber, surmounted by a colonnade carrying a stepped pyramidal roof which supported the statue of a four-horse chariot. It derives from an Asian tradition of monumental tomb-building, typified earlier by the vast chambered tumuli of the Phrygian and Lydian kings, and the tombs on high podia of the Lycian dynasts, such as the slightly earlier **Nereid Monument at Xanthos** (p. 136B). There is also a possible influence from the Tomb of Cyrus the Great, founder of the Persian Empire—Mausolus was nominally a local governor (satrap) under the jurisdiction of the Persian king. The Mausoleum was destroyed in 1402 by the Knights of St John to provide building material for their castle at Halicarnassus (Budrum). Recent studies have shown that the podium measured $38.4 \text{ m} \times 32 \text{ m}$ ($120 \text{ ft} \times 100 \text{ ft}$), decreasing in three 'steps' to a stylobate of $32 \text{ m} \times 26 \text{ m}$ ($105 \text{ ft} \times 85 \text{ ft } 4 \text{ in}$) and decorated with sculpture at each step, including a frieze under the stylobate. The columns were Ionic, with a typical eastern Greek entablature with dentils rather than a continuous frieze. The roof decreased by twenty-four steps to the base of the enormous chariot group which crowned the monument. This probably contained statues, representing either Mausolus and Artemisia, or Apollo. The statues in the British Museum, often described as Mausolus and Artemisia, come from a series of statues, possibly representing the ancestors of the dynasty, which stood between the Ionic columns. This device was taken from the Nereid monument and repeated later in a sarcophagus in the royal cemetery at Sidon: decorated in the form of a roofed Ionic building, the '**Sarcophagus of the Mourning Women**' (p. 138K) also has a frieze beneath the colonnade. The architect of the Mausoleum was Pythius, in collaboration with Satyros. Pythius later became the architect of the temple of Athena Polias at Priene. The sculptural decorations were the work of fourth-century sculptors Scopas, Bryaxis, Timotheus and Leochares. The Mausoleum not only became the generic term

for monumental tombs, but inspired later imitators and derivatives. In the regions adjacent to Halicarnassus are two important Hellenistic examples, the **Lion Tomb at Cnidus** (p. 138J), perhaps of the second century BC, and the third-century **Mausoleum at Belevi**, in the territory of Ephesus. There is an early Roman example, smaller in scale but still monumental, at Mylasa, the original capital of Caria. Another series of tombs which may have been inspired by the Mausoleum are very different in appearance. These are the tombs constructed for the members of the Argead dynasty which ruled Macedonia and are located at the old Macedonian centre of Aegeae, the modern Vergina. In the Mausoleum the burial chamber was situated deep in the podium; the form of the roof is uncertain, but it was probably a corbel vault which also seems to have been used in the Lion Tomb. In Macedon, earlier burials had been in pits, lined with stone or timber, covered with branches and with a small mound heaped on top. In these, of course, the woodwork soon decayed but in the first half of the fourth century BC the philosopher Democritus had described the principle of the keystone vault which was adopted by the Macedonian kings to give a durable roof to their burial pits. It was combined with the forms of conventional Greek trabeated architecture by the addition to the chamber of a facade, in the form of an engaged order with half-columns and entablature. An early example is the unplundered tomb found by Professor Andronikos in 1978, which is beyond reasonable doubt the Tomb of **Philip II**. This has two chambers, whose vaults, though continuous in line, were constructed separately. In front of them, the facade has two engaged Doric half-columns in antis with full entablature, but supporting a rectangular screen in the form of a painted frieze, rather than a pediment, in front of the vault. Somewhat illogically, later tombs combine the pediment screen with the vaulted roof. This tomb and the considerable series of later Macedonian tombs which derive from the royal burials demonstrate the competence of Macedonian architects in vaulted and arched construction. Being buried, the tombs preserve in almost perfect condition, and with the original tones, the painted decoration applied habitually to the Greek orders.

Bibliography

A bibliography covering both Chapter 5 and Chapter 6 will be found on p. 153.

Chapter 6

THE HELLENISTIC KINGDOMS

Architectural Character

Alexander's policies for controlling his empire included the foundation of Greek cities in strategically and economically important localities from Egypt to Bactria, a policy initiated by his father Philip in his subjugation of the Balkan peninsula, and continued by the Macedonian generals who carved kingdoms for themselves out of Alexander's empire after his death. Important examples are Antioch (Antiocheia) in Syria, Seleucia on the Tigris, and Apamea (named after the wife of Seleucus I) which are Seleucid foundations. The Ptolemies who ruled Egypt were more sparing in the use of dynastic titles and their only creation is Ptolemais in Upper Egypt; Ptolemais in Cyrenaica is an existing city, renamed. All these cities appear to have been given the institutions of Greek civic organisation, though they remained effectively under the control of the kings; the palace of the Ptolemies was in Alexandria, and the Seleucid kings ruled from Antioch. Architecturally also, they followed the model of the Classical Greek cities, but since they had royal connections, and served to enhance royal prestige, much more money was available for their embellishment, a process which spread by emulation to other, perhaps older, Greek cities which could afford such architectural indulgence, or could lay claim to the financial support of one or other of the kings.

In broad terms the Hellenistic age presents a cultural unity which transcends political borders, but there are nevertheless important differences between the various states and regions. The Greeks and Macedonians were always a minority, even if one includes with them peoples not Greek by origin who adopted the Greek language and way of life. Where the conquered country remained conscious of its identity, for example in Egypt or the Seleucid kingdom, the local vernacular styles continued. Other areas became more thoroughly Hellenised, especially regions adjacent to Greek cities founded before Alexander's conquests, or already subject to direct Greek influence. This is noticeable in Phoenicia, where the Kings of Sidon had already Hellenised, and above all in Asia Minor, following the earlier example of the Lycian

and Carian dynasts. Thus there are different intensities of Greekness and so of Greek-styled architecture in the Hellenistic world, combined with different forms of local tradition and varying levels of wealth. An accidental difference, which limits knowledge of the period, is the widely varying degree of preservation (and discovery) of the buildings of the Hellenistic age. Important places such as Alexandria and Antioch were entirely ruined and much is lost. Other areas, particularly the coastal regions of Asia Minor, were far better preserved and have been most thoroughly explored. Allowance needs to be made for the distortions this causes, and generalisations based on inadequate evidence may be misleading.

Examples

Temples and Related Monuments

Though Alexander had attacked the Persian Empire as the champion of the Greeks and with Greek allies, the conquest was very much a Macedonian achievement. The successor kings were Macedonian, and Macedonian traditions were maintained at court. The architectural influence this created was essentially that of Macedon, which had been developed, at the end of the fifth century BC, by King Archelaos, and reinforced by Philip. It was part of the Greek mainland tradition and therefore emphasised the Doric order. There are some Ionic buildings at Samothrace, for example the so-called Temenos of 340 BC, and among the tombs. An important Macedonian Ionic building is the circular *Phyllipeion* at Olympia (p.121), a marble building completed by Alexander in 336 BC, and consisting of a colonnade with eighteen Ionic columns supporting an entablature which combines a continuous frieze with a superimposed row of dentils, a form apparently used also in the Temenos at Samothrace, commissioned by Philip. At Olympia the continuous frieze has anthemion decoration and replaces the upper fascia of the architrave, coming above a low moulding. Later Hellenis-

tic Ionic buildings normally combine the two forms of frieze while maintaining a full triple-fascia architrave. The columns of the Philippeion have only twenty flutes instead of the canonical twenty-four, a form found in Ionic orders from Peloponnesian (southern Greek) buildings. The Philippeion was a commemorative building for the Macedonian royal family, and housed statues of them. The distinctive form of its Ionic order was repeated for a Macedonian tomb at Aegeae, sometime in the third century BC.

Nevertheless, Doric seems to have predominated in the Macedonian architecture of the newly conquered areas. Doric is found at Alexandria in tombs and the temple at Cape Zephyrion and at Seleucia on the Orontes, the harbour of Antioch. An early Hellenistic Doric temple (the date is disputed) was that dedicated to Athena at Troy by the successor King Lysimachus. Hexastyle with twelve columns along the flank, the capitals of this had the low straight-sided echinus which had evolved in the fourth century BC (the height and proportions of the columns are unknown), and which accord best with a date in Lysimachus' time, about 300 BC. The temple of Athena Polias at Pergamum in Asia Minor is another Doric building, probably of the mid-third century BC. It has 6 x 11 columns fully seven times their diameter in height and widely spaced so that there are three triglyphs and metopes for each intercolumniation. There is a small Doric temple, to Demeter, in the Ionian city of Priene. Doric temples were still built, of course, in the traditional Doric areas, such as the temple of Zeus at Stratos in north-west Greece. More spectacular seems to have been the imperfectly known, colossal Doric temple at Lebadeia in Boeotia, for which an interesting building inscription survives. It was dedicated to Zeus the King (Basileus) in about 175 BC, the gift of the Seleucid King Antiochus IV. The inscription suggests that the whole project is an example of a deliberate revival of earlier architecture.

Although the Ionic order seems to have become more important than Doric in the architecture of Hellenistic temples, this may result from our more extensive knowledge of the temples of Asia Minor, the traditional Ionic area.

The Ionic impetus had begun in the period before Alexander, with the reconstruction of the temple of Artemis at Ephesus which continued into the Hellenistic period, with the architecture of Mausolus and his successor Idrieus in the Carian sanctuary of Zeus at Labranda, and the temple of Athena at Priene dedicated by Alexander the Great, who was allowed to put an inscription to that effect on the temple. This practice also relates to earlier Macedonian buildings at Samothrace and became common in the Hellenistic period. A most important Hellenistic revival is the Temple of Apollo at Didyma near Miletus (pp. 130N, 145J-P) on which work probably began before Alex-

ander, but which was particularly supported by the successor King Seleucus, who restored the cult statue taken from the archaic temple to Persia by Darius when he destroyed it. This is an abnormal building, but the abnormalities appear to be copied from the sixth-century predecessor whose ruins were presumably still intelligible. It is very large, 51.1 m x 109.3 m (168 ft x 359 ft), and is the only Greek decastyle temple. There are twenty-one columns along the flanks and the arrangement is dipteral. They are 28.8 m (64 ft 8 in) high, and stand on a base with seven steps; the latter being too high for conventional use, they are doubled in number in front of the cella and set between projections which resemble the parotids of Roman temple bases. In plan the cella has the traditional Ionic form, with a deep porch and no false porch at the end; there is, however, an anteroom which appears on plan to be placed between the porch and the cella. This is misleading. Though the great front door opens into the anteroom it does not provide access to it, for its threshold is a full five feet above the level of the porch. Instead, two small doorways to either side lead to narrow, sloping vaulted passages which run direct to the cella, whose floor is at the original ground level, not, as is usual, at or a little above the level of the stylobate. The walls of the cella are decorated with a string course at stylobate level, with engaged piers above. The cella was not roofed, again a feature inherited from the earlier temple and probably shared with the temple of Artemis at Ephesus. The cult statue was placed in an inner shrine, a small tetrastyle prostyle Ionic temple within a temple. At the east end of the cella a splendid wide staircase leads up to the anteroom (the only possible means of approach) through doorways flanked by engaged Corinthian half-columns. This peculiar arrangement may be connected with the oracular purpose of the shrine, and there must have been a religious necessity for it if, as seems likely, it is all repeated from the earlier temple. To either side of the anteroom are well-built and decorated staircases, now ruined but leading as high as the building is preserved; their purpose is uncertain. Work on the temple was carried out in fits and starts; in the early third century BC, with later resumptions. Some of the construction belongs to the Roman period, and it was never completed.

Another large Ionic temple, also unfinished, is that of Artemis at Lydian Sardis whose cult goes back to the days of Lydian independence, when the rites were performed at an altar, rather than in a temple. The plan as first published was confused, but it is now clear it belongs to the third century BC, not earlier, as was once thought. Originally, about 281 BC, given a simple cella facing west, it was divided by an added cross-wall after 223 BC, and an extra door was cut in the formerly blank west end.

The Temple of Artemis Leukophryene at Magnesia on the Maeander was the masterpiece of Her-

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mogenes, the most important architect of the Ionian revival during the Hellenistic period, who also wrote treatises on architecture known to Vitruvius and probably used by him for the Greek parts of his handbook. Hermogenes' date is a matter of some dispute, some authorities putting him at the beginning of the second century BC, though details at Magnesia suggest rather a date about 150 BC. This temple is pseudodipteral octastyle with widened central intercolumniation, which implies a revival, since this was not used in the temple at Priene, though of course it occurs in the rebuilt temple of Artemis at Ephesus. Vitruvius claims the arrangement was invented by Hermogenes, but it is rather, here, a revival of an earlier concept. There are fifteen columns on the flank and the overall dimensions are 58 m × 32 m (190 ft 6 in × 105 ft). The height of the column is unknown. More important than the details of the temple is its setting. It stands in a totally enclosed courtyard, whose alignment like that of the temple differs from that of the city grid plan. The entrance helps disguise this; it is made through a propylon contained within the surrounding colonnade of the agora, which lies in front—in this case, to the west. The temple dominates its enclosure (which may not have been completed), taking up a far greater proportion of the total area than in earlier Greek sanctuaries. The temple is placed not centrally, but towards the end of its precinct; in front of it is a monumental altar. A detail typical of Hermogenes' architecture is the double moulding at the top of the architrave—astragal surmounted by ovolo surmounted by cyma reversa. This moulding persisted in Roman architecture, both Ionic and Corinthian, but it is the concept of the temple in a relatively small colonnaded court which made the greatest impact on later architecture. It was repeated in appropriately modified form in the Imperial Fora at Rome and in the standard temple/forum arrangement of western Roman cities.

Equally important to later Roman architecture was the Hellenistic application of the Corinthian order to the external embellishment of temples. Corinthian was used for a stoa at Miletus in the third century BC, a building given to that city by the Seleucid queen Laodicea, wife of Antiochus II. Its use for temples is first attested, however, in the second century BC, in two temples sponsored by Antiochus IV: that at Olba, Uzuncaburg in Cilicia, to Zeus Olbius, and the unfinished temple of Olympian Zeus at Athens, completed by Roman emperors Augustus and Hadrian. The temple at Olba is hexastyle 6 × 12 and measures approximately 22 m × 40 m (72 ft × 131 ft). The lower parts of the shafts have facets rather than flutes, which are used only on the upper part. The temple at Athens utilises the foundations of an earlier temple, attributable to the late sixth century BC and commissioned by the tyrant Hippias. It seems to have been intended as a Doric equivalent of the colossal archaic

Ionic temples of Asia Minor, but the work was abandoned on the downfall of the tyrant. The new temple measured 41 m × 108 m (134 ft × 354 ft). It was dipteral (tripteral at the ends), 8 × 20. It had a deep porch, internal colonnades close to the walls, and an adyton at the west end. The architect, Vitruvius tells us, was a Roman citizen called Cossutius, but he was clearly working in a Hellenistic architectural tradition.

Another very important temple was that dedicated to Serapis in Alexandria by Ptolemy III in the second half of the third century, completely rebuilt in the Roman period, and stripped of its building material in the Middle Ages. It has been suggested that certain Roman coins of Alexandria depict the Hellenistic temple, and show it to have been Corinthian; if so, it would have been earlier than Antiochus IV's Corinthian temples, but the evidence is tantalisingly slight.

It is likely that the use of Corinthian on the exterior of buildings, whether stoa or temple, is a reflection of local influence in the Seleucid kingdom and, probably, Egypt. For non-Greek taste, the Doric order, brought with them by the Macedonians, was too austere, while Ionic had evolved in a more formal way than its eastern prototypes. The tall Corinthian capital with its plant decoration reflected earlier Egyptian forms. It was, however, purely Greek in its developed form, and therefore acceptable to Greek taste. Less monumental, but showing much stronger Egyptian influence, are religious buildings put up in areas of Greek settlement, and not intended primarily for Egyptians. These are found in the Fayyum district, for example at Soknopaiou Nesos.

Urban Architecture

Urban architecture during the Hellenistic age became more substantial. It was dominated by the grid-plan cities created for Alexander and his successors. There were also grid-plan cities which were refoundations, either following earlier destruction or by a process (also seen in the Classical period) of merging together formerly scattered populations into new urban centres. These provide the most complete information, following the loss of Hellenistic Antioch and Alexandria. The best known are the cities of Asia Minor, extensively excavated from the late nineteenth century: Priene, Miletus, Magnesia and Pergamum.

✓ Priene (p. 146A) is the most completely explored of all Greek cities. It is disputed whether its refoundation was the work of Mausolus in the 350s, or of Alexander in the 330s, but its buildings belong essentially to the Hellenistic age. Not all the available area within the city walls was developed. The site is a sloping shelf below steeper mountain cliffs, on the top of which was a military stronghold. The town was limited to this shelf, and there was no building on the

steeper slopes immediately below the cliff. At the centre of the grid plan was the **agora**, occupying two blocks of the grid, about one-fifteenth of the built-up area of the city. Some terracing was necessary on the south side to provide a sufficiently extensive flat area. The main street ran from the western gate of the city to the agora, and across its north side. (It is characteristic of the Greek agora, like the traditional Roman forum, that streets run through it. This can be seen at Athens, also.) The agora was completely bordered by stoas: one to the north of the road was an independent structure, while the one on the east, south and west sides was continuous, with the two outer north-south streets directed past the back of the stoas. They were built probably in the third century BC. As is usual with Hellenistic stoas, even in the Ionic area, they are built in the Doric order, with the wide spacing of the columns requiring three triglyphs and metopes to each intercolumniation. The north stoa probably had rooms behind it, as did the other on the west and south. The north stoa was destroyed, and replaced in the second century by a larger stoa, again Doric, with two aisles. This is extended along the width of the adjacent building block to the east, but has rooms only along the original length of the first two blocks. It measures $116.5\text{ m} \times 16.8\text{ m}$ ($382\text{ ft} \times 55\text{ ft}$) including the rooms. The portico only is 11.8 m ($38\text{ ft } 9\text{ in}$) deep. The outer colonnade is Doric, in the usual spacing, the taller inner columns Ionic. All these stoas are built of carefully worked limestone, though the detail tends to be mechanical and repetitive, and the floors are beaten earth. The south agora at Miletus is a much larger example, with a long stoa on the east side $189.2\text{ m} \times 22.7\text{ m}$ ($621\text{ ft} \times 74\text{ ft } 6\text{ in}$) with two sets of rooms, one accessible from the agora, the other from the street which passed outside to the east. There are two other L-shaped stoas on the north and south, with a gap between them (and between them and the east stoa). Here, as at Priene, the main road leads through the agora, but in late Hellenistic times it was shut off at both ends by gateways built between the east and the adjacent stoas.

Major improvements to the irregularly shaped traditional agora at Athens (q.v.) in the second century BC, with the support of the kings of Pergamum, were undoubtedly intended to convert it to a more regular form. Three stoas were built to achieve this; the Stoa of Attalus (p.146B) on the east side is a two-storey building, $116\text{ m} \times 19.4\text{ m}$ ($381\text{ ft} \times 63\text{ ft } 8\text{ in}$), with a Doric colonnade on the ground floor, and an Ionic upper colonnade incorporating a balustrade. All the facade is in marble. The inner ground floor colonnades are equal in height to the exterior to support the floor above, but at double spacing they are Ionic. The inner colonnade of the upper floor has columns of palm-leaf design developed in Pergamum. There is a row of rooms behind the colonnades on both floors. The details are unsatisfactory, in comparison with the forms of Classical Athenian architecture. More im-

portant is the way the stoas are used to close off the agora to a regular plan. This is particularly noticeable in those which replace the original south stoa, that is to say the new south stoa, $93.6\text{ m} \times 8.5\text{ m}$ ($307\text{ ft} \times 28\text{ ft}$), running at right angles to the stoa of Attalus, and the middle stoa, $146.6\text{ m} \times 19.9\text{ m}$ ($481\text{ ft} \times 65\text{ ft } 6\text{ in}$), which has colonnades to either side of a central longitudinal wall.

Stoas were employed at Pergamum and towns under Pergamene control not only to delimit open areas and courtyards, but to help create them. The same principle can be seen, earlier, in the south stoa of the agora at Priene, which is built over and along the terrace wall which helps create the flat area for the agora itself. Behind the north stoa at Priene is an assembly building (p.148), substantially constructed with limestone walls, and with stone seats arranged in straight lines round three sides, to hold perhaps 640 people. It is for the restricted popular assembly of a small town rather than a council chamber, but the form is similar to the Classical council houses at Athens and at Miletus; the latter, like the Priene building, is second century BC in date. There is no architectural embellishment at Priene, except for the entrance doors and an arched opening in the south wall. It is structurally interesting; the original span of 14.5 m ($47\text{ ft } 6\text{ in}$) proved too great, and the roof collapsed. Subsequently the supports were moved in by two metres. The Council House at Miletus (p.146C) was another gift of the Seleucid King, Antiochus IV, made in about 170 BC. It has seats arranged in a circular plan within a rectangular building, like the new Council House at Athens. The exterior was embellished with engaged Doric half-columns on the upper part of the wall, with echini carved in the Ionic manner in an ovolo pattern, supporting an Ionic entablature. This variation from Classical rules, and the use of a decorative pseudo-peripteral order, are distinctive aspects of later Hellenistic architectural taste.

During the Hellenistic period there were substantial improvements in buildings used for dramatic and athletic activities. Greek theatres, which were unroofed, consisted of three parts, the auditorium (cavea or koilon), the orchestra or dancing floor, and the stage building or skene. The cavea provided seating for a mass audience, in most theatres numbered in thousands. The orchestra was the area where the chorus of each play danced and sang. This was an integral part of the drama in the fifth century BC. The actors were confined to an area behind the orchestra, possibly not yet raised in the form of a stage, but with some form of temporary structure behind (the stage building) which acted as a backcloth, and must have included the door openings which are seen to be necessary for the proper staging of the action in most plays that have survived. The stage building was separated from the cavea by a passage to either side, the parodos (plural, parodoi).

In the Hellenistic period, theatres were normally provided with permanent auditoria (caveas) in stone, and stage buildings. Stone seats of a rough and ready form had already appeared in the fifth century BC in the theatre at Thorikos in eastern Attica. This cavea was of irregular shape, having a straight central section of seating, which curved round at either end. The major Athenian theatre in the sanctuary of Dionysus on the south slopes of the Acropolis (p.110B) had only wooden seating during the fifth and early part of the fourth century BC, and its exact arrangement is a matter of dispute. It was given stone seating in 346 BC. Here the cavea is placed round a circular orchestra (dancing floor), extending on either side beyond the diameter of a semicircle. The stage building was given durable form, though the arrangement of it at this date is again uncertain. The plan of the seating is not complete and symmetrical, because of adjacent structures.

The best-preserved cavea in Greece is that at the Sanctuary of Asklepios at Epidauros (p.150), built shortly after the middle of the fourth century BC, a date attested by epigraphic evidence. The seating, divided into segments by stairs, has a lower section with thirty-four rows of seats and an upper section with twenty-one, separated by a walkway or diazoma; the upper section does not extend as far as the lower. The orchestra has a diameter of 20.4 m (67 ft). The stage building is completely ruined, but had a raised stage, with higher rooms behind which were approached by ramps from the parodoi, which were later given entrance screens.

In Hellenistic theatres the circular orchestra was retained as an essential element in theatre design. Only in the theatres of the Roman period was it reduced to a semicircle, and used for seating. A good example of a Hellenistic theatre is that at Priene (p.146A) situated on the hill slopes at the northern limits of the town. The cavea is relatively well-preserved—recent excavations have revealed more of its upper seating—but the theatre is particularly important for its excellently preserved stage building. The stage is high, with a facade of Doric half-columns and an entablature. The stage building behind rose higher, and there is evidence for three doors or openings in it. There is epigraphic evidence for the existence of a theatre at Priene in the time of Alexander but the present cavea and stage building probably were constructed in the second century BC. This theatre was also used, as often in Greek cities, as a political meeting place in which the majority of the citizen population could gather.

During the late Hellenistic period the tendency appears to be for the building behind the stage to become higher and more ornately decorated with columnar facades, although that at Priene appears to have been of plain masonry only. Some auditoria hardly extended beyond the diameter of the semicircle (that at Miletus is a good instance), and it is likely

that at least some of the well-preserved theatres in Asia Minor whose caveas are limited to the semicircle are late Hellenistic in date. There is thus a discernible tendency for the theatres of the Greek world to evolve towards the form employed for new theatres during the period of the Roman Empire.

The stadia for athletic contests were also improved during the Hellenistic age. The stadium at Epidauros was placed in a natural elongated hollow, and this sufficed during the fourth century BC. In the third century it was given stone seating, with some artificial terracing to improve the layout. A stadion or stade is a unit of measurement (600 ft) and most athletic stadia conform to this. Recent excavations at the sanctuary of Zeus at Nemea have shown that a developed stadium with regular stone seating was constructed there about 325 BC. It had a tunnel-vaulted passage under the seating to give direct access from outside to the running track. Similar vaulted passages at Epidauros and Olympia have usually been dated to the Roman period, but the evidence at Nemea is conclusive and they are better regarded as Hellenistic. The concept of the tunnel vault would seem to have been introduced into southern Greece from Macedonia, where it was already being employed for the royal tombs (q.v.). Similar vaulted passages were constructed through the cavea of the theatre at Sicyon, a building erected when that city was redeveloped by the Macedonian King Demetrius about 300 BC.

Other athletic activities took place in the gymnasium, which also assumed a more distinctly architectural character in the Hellenistic period. The gymnasium is another building type in which an open colonnaded court forms the major element. Some are very large, such as the gymnasium at Olympia (p.121) though as this is in part eroded by the adjacent river Cladeus, its full extent cannot be measured. There are the remains of long Doric stoas on the north and east (the east stoa being double-aisled) and a separate propylon; south of this is a smaller building, conventionally termed the palaestra or wrestling ground, since its arrangement fits closely Vitruvius' description of this category of building. However, both in size and form it is similar to a building by the stadium at Priene (p.146A) which is known to have been the gymnasium. These are both totally enclosed Doric colonnaded courts, that at Olympia having a peristyle 41.5 m (136 ft) square with nineteen columns on each side, while that at Priene measures about 35 m (115 ft) square and has sixteen columns on each side. Both have rooms behind the colonnades. The gymnasium at Priene, unlike that at Olympia, functioned as a school. The open school hall on the north side has carved on its walls the names of school-boys who sat in it. There is also a well-preserved washroom, with stone basins round the wall, fed with cold water by lion's head spouts.

A similar 33 m (108 ft) square building at Epidauros was thought also to be a gymnasium. The

arrangement of the majority of rooms, however, indicates that this was clearly a building for feasting rather than athletic activity. Like other buildings at Epidauros it was entered by a ramp rather than steps, probably to enable processions to make their way into the buildings with greater dignity.

The courtyard arrangement continues to be used for houses which in the Hellenistic period achieve a splendour and quality not readily found amongst their Classical predecessors. An example is the **Palace of the Macedonian Kings at Vergina (Aegeae)**; probably built at the end of the fourth century. It has a Doric peristyle court with sixteen columns on each side, about 42 m (138 ft) square. There are rooms on all four sides, many of them recognisably arranged to hold dining couches. Two on the south side with splendid mosaic floors were approached through a separate vestibule, and have marble thresholds. Others hold more couches, and were less splendidly decorated. The superstructure is mostly of unburnt brick.

Other royal buildings such as those of the Kings of Pergamum are less spectacular; they are modest houses, but with good quality decoration, and are well situated in an elevated position in the citadel town. Far more splendid must have been the royal quarter at Alexandria, now entirely lost and for knowledge of which we rely on written descriptions. Though conventionally called a palace it was a collection of buildings in a demarcated part of the city, of which it occupied a considerable proportion, perhaps as much as one-third. Apart from the royal apartments it included religious, administrative, reception and garrison buildings, as well as the museum and library arranged in a park. A particularly famous structure was a dining pavilion, a tent rather than a building in the proper sense, which held 100 couches and was most luxuriously equipped.

There are many ordinary houses of the Hellenistic period. Those at Priene (p. 146A) often include a megaron arrangement for their principal rooms, but this is unusual and is not found in the houses on the **Island of Delos** (p. 152). In both places the houses are provided with internal courtyards with indirect access, as in the earlier Classical buildings from which they evolved. Stone columns are frequent at Delos (where there is no timber) and some houses, to take advantage of a sloping site, have rooms at several levels, though two storeys are normal. The evidence for ordinary houses at Alexandria is scanty, but they undoubtedly introduced a new aspect into Greek domestic architecture, namely that of the multi-storey tenement block. They are referred to as towers, 'pyrgoi'.

Funerary architecture of the Hellenistic period is varied. Apart from the Mausoleum already described (Chapter 5), there are important series of rock-cut tombs, especially those at Cyrene, cut into cliffs or other vertical faces which are given regular archi-

tectural facades, leading either to burial chambers with recesses ('loculi') for sarcophagi, or with several openings in the facade leading directly to the loculi. Burial places at Alexandria include rock-cut chamber tombs, with stairway approach and chambers opening off a courtyard excavated into the flat rock surface. Those at Mustapha Pasha, to the east of the city, have Greek architectural forms, such as engaged Doric half-columns, and appear to date to the early second century BC. Others, such as those on the island of Pharos, are decorated with Egyptian motifs.

Another important part of Hellenistic architecture is the **circuit walls** which protected and defined the city. Even in the Classical period the lime-washed mud-brick fortifications had been considered an embellishment. Developments in the art of siege warfare, and the construction of more and more powerful siege engines, led to an improvement in the structure of walls. In the Hellenistic period these were normally faced in stone for their full height, with varying types of fill aimed at preventing the total collapse of the structure if part of the face should be breached. The masonry was normally heavily rusticated ashlar to give an impression of strength. In the later Hellenistic period there was a deliberate revival of the older polygonal masonry technique. The towers of fortifications were built higher to house defensive artillery. The rampart walks were protected, often by continuous parapets rather than battlements. Walls are generally best preserved in the remoter and less important cities: there are excellent examples at Herakleia near Miletus, where the masonry is rusticated ashlar, and, in a very well preserved state, at a site identified as the ancient Cydna, in Lycia, where revived polygonal masonry was used.

Late Hellenistic Architecture

Because the buildings so far described were largely in towns which were already Greek before Alexander's conquests, the element of continuity from Classical times is clear. For the most part, they are improved versions of building types which existed in the fifth century BC. There are indications of different developments in other parts of the Hellenistic world. Excavations at **Ai Khanoum** in northern Afghanistan have revealed a **Hellenistic Greek city**, laid out on a grid plan. Buildings which have been investigated, such as the Propylaea, suggest a mixture of conventional Greek types with non-Greek elements, particularly in the methods of construction used, which suggest strong influences from the architecture of the Persian Empire. It seems likely that more florid architecture, involving the development of the Corinthian order, and increasing emphasis on decorative engaged orders, or columns used in non-structural screens placed against or close to walls, was particu-

larly favoured in areas which were not traditionally Greek. Such architecture has been termed 'Baroque', though the use of a term which has a precise significance in later architecture is perhaps unfortunate. Nevertheless the term gives some indication of the flavour of these architectural forms.

The complete breakdown of the geographical distinctions between the principal Classical orders is a noticeable feature of the Hellenistic age. Ionian cities such as Priene and Miletus were as much dominated by their Doric colonnaded courts as by their major Ionic temples. The dynasts of Caria were already superposing Doric entablatures over Ionic columns in the fourth century BC, and this occurred again in the late Hellenistic period. The proportions of Ionic and Doric columns became similar, as Ionic grew slightly stockier, and Doric became distinctly more slender. During this late Hellenistic period the Corinthian entablature developed new forms. The ornate Corinthian columns were given entablatures in the full, Hellenistic Ionic form, with architraves divided into three fasciae, and dentils over continuous friezes with the appropriate carved mouldings; the number of mouldings increased—astragals (beads and reels) being added between the fasciae. Cornices were elaborated with modillions (consoles).

The late Hellenistic forms probably developed in the major kingdoms, Ptolemaic Egypt and Seleucid Syria; the best-preserved late Hellenistic city, however, is without any doubt Pergamum, which emerged (from very nondescript beginnings) in the third century BC as the capital of a dynasty which, with an increase in power and influence, elevated itself to royal status. It then had to catch up with the older royal capitals. The city occupies an impressive site, a hill overlooking the Caicus Valley, and was built on the slopes right up to the summit. On such a site no grid plan is possible and there are no flat areas on which to build; these have to be constructed by building massive terrace retaining walls. The terrace walls are visually of the greatest importance, and were often enhanced by additional fascia walls, supported perhaps with arcaded buttressing or colonnades. On such a site the details of the orders employed, so important to the character of Classical architecture, are less significant than the general effect. The resulting combination of details from the different orders, and the introduction of new elements such as volute-brackets or modillions under cornices typical of late Hellenistic architecture, were adopted and imitated by Roman architects.

As these forms developed, the Hellenistic world collapsed into political and economic ruin. The tradition, however, was firmly established, and was taken over (along with the architects and craftsmen) by the Roman conquerors. The final influence of the Hellenistic age can be clearly detected in some of the buildings of Augustan Rome, especially in monuments such as the Ara Pacis Augustae.

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Whether roofed or enclosed with a railing or wall, Bo-tree shrines were usually terraced on three or more levels, each enclosed by a fence. Steps with makara balustrades and entrances as well as guard-stones (p.758B) were decorated with traditional grotesques, royal figures and moonstones (p.758A). An entrance of this kind can be seen at the Bo-tree shrine at Anuradhapura.

Image Houses

NOTE The image house developed late in Buddhist architecture. The canonical sanction to sculpture the Buddha was not obtained until the first century AD—six hundred years after his death. The earliest images of the Buddha appeared in the monasteries of Gandhara in the north-west and in central India. The first images appeared as reliefs depicting the life of the Buddha and as figures in existing buildings such as stupas or Bo-tree shrines, but not as a single image in a building specifically meant for worship.

Placing the image in a separate shrine began at Nagarjunakonda (third century) where two rooms were set apart on either side of a residence, one for the stupa and the other for a Buddha figure. This practice was common from the first century. Images of Buddha were engraved on the stupas at Ajanta, Ellora and Nasik.

The introduction of the Buddha-image as the central figure occurred first in an existing cell of a rectangular monastery at Ajanta (Cave No. 11) (c. 400), and gradually it became the practice to assign the best cell of the monastery to the Buddha even though he had forbidden the making of images in his likeness. The monastic cells at Taxila (p.758C) also had a chapel for the image. Cave No. 2 at Ajanta elaborates this arrangement still further, and in Cave No. 8 at Ellora (p.757J) there is an ambulatory passage round the cell containing the image of the Buddha.

The free-standing image house soon followed. The Gupta period image house at Sanchi (fifth century) (p.757F) with a cell and a porch is an outstanding example; that at Kusinagara contains a recumbent figure. The earliest examples in Sri Lanka also belong to the fifth century, for example the image houses at Vessagiriya (p.757D) and Pachinatissapabatha, both at Anuradhapura. They consisted of square inner cells in which the image was placed on a pedestal on the rear wall. In front of the cell was a smaller square room (mandapa) for the worshippers. The early buildings housing free-standing images had brick walls and timber roofs but after the eighth century image houses were usually vaulted, as at Pahapur, Polonnaruwa and Nalanda, or were carved out of the solid rock, images and shrines enclosed in brick walls, and roofed back to the rock face. In other cases the buildings are tucked under the overhanging rocks as at Dambulla, Sri Lanka (p.758D).

There are fine examples of both rock-cut images and their associated shrines at Polonnaruwa in Sri Lanka and at Bamiyan, Afghanistan. The Gal Vihara group of colossal Buddha figures (twelfth century) (p.758E) at the north-eastern edge of Polonnaruwa are carved from the dark granite of a gently inclined outcrop of rock. The recumbent figure, some 14 m (46 ft) long, which represents the dying Buddha about to enter Nirvana, and the standing figure at his head are justifiably famed throughout the Buddhist world. Shallow rock cellae behind the recumbent Buddha and between the standing and sitting figures can now be seen with their supporting columns at the rock-face, but like the figures themselves were originally enclosed by walls and roofed-in. The lowest courses of the walls remain, but otherwise all enclosing structures have now disappeared.

The huge rock-cut group at Bamiyan, Afghanistan (fifth century), consists of monasteries and their associated temple buildings and indicates Persian and central Asian influences. The group is carved out of a sandstone cliff face, its interior honeycombed with sanctuaries and assembly halls extending for nearly 2 km (over 1 mile); the cliff has a painted niche at either end, each sheltering a vast statue of the Buddha, the one to the west some 54 m (175 ft) high (p.753D), that to the east of the Gandharan type. These statues provide prototypes for the colossal image cult, later to appear in China and Japan. The body and head of each statue was roughly hewn from the rock, the features and draperies modelled in mud mixed with straw and finished in lime plaster painted and gilded.

There are also famous free-standing image houses in Sri Lanka. The Lankatilleke image house at Polonnaruwa (twelfth century) (p.759A,B) is built in red brick, is 52 m (170 ft) long and 20 m (66 ft) wide, its walls some 3.6 m (12 ft) thick. The roof, no longer extant, probably had a number of pavilions and a pinnacle at the west end above a brick and stucco image of the Buddha. There is a shrine and antechamber in an opening in the wall, a vestibule and a porch. The entrance is flanked by solid polygonal turrets with dwarapalas (door-keepers) at high level and carved stone steps with guard-stones. Another Sri Lankan example of the same name, the Lankatilleke image house, is at Kandy (p.757E). It has a centralised plan with an ambulatory entered from all four sides of a square, but only the main stairway through the vestibule leads to the image at the centre of a smaller inner volume, also square on plan.

Image houses were also erected for Bodhisatvas (aspirants to Buddhahood) such as that at Dambegoda, Sri Lanka, which housed an exquisite figure about 9 m (30 ft) high. Many of the image houses were lavishly decorated, as at Polonnaruwa, where paintings depict episodes from the Jatakas (records of the previous lives of the Buddha) and the life story of the Buddha before and after enlightenment.

Relics were of three types, namely body relics, associated relics and representative relics. The first two types form the composite objects of veneration in a relic house. The last type implies an image. Body relics and other relics associated with them have been mentioned as deposits in stupas, but similar relics were also placed in relic houses, where they were more evident to the devotee.

The Sacred Tooth Relic, for example, was brought to Sri Lanka in the fourth century from Kalinga in east India. It is now housed in the **Temple of the Sacred Tooth Relic (Dalada Maligawa)** at Kandy, in Sri Lanka (sixteenth century, restored late eighteenth century) (p.759C). The main edifice was a two-storey timber structure with stone columns with carved wooden capitals resting on a high plinth. The relic has been encased in seven metal caskets and placed at first floor level. The shrine, now in an inner courtyard, has a first-floor verandah with a balustrade of turned and lacquered wood (p.760A).

There are other relic houses at Gedge, south of Anuradhapura (eleventh century), and a tooth-relic temple at Polonnaruwa. The former is a single-cell centralised plan, the latter has an antechamber with six columns.

The sacred tooth is a typical body relic, whereas the vajrisana on which the Buddha sat at the moment of enlightenment at Buddh Gaya is one of those associated with the Buddha's own activities. As well as the Bo-tree shrine, the second-century BC relief at Barhut depicted a relic house which sheltered the head-dress of the Buddha—a square building with a domical roof resting on pillars, and a porch-like entrance. The sacred object rested on a decorated throne or asana. The relic house at Buddh Gaya (fourth century with later restorations, especially thirteenth century by the Burmese and in the nineteenth century) was built as a brick tower reaching the height of 54 m (180 ft). This was the building described by Hsuan-Tsang when he visited the site in the seventh century. The square tower rose sharply from a massive square podium to form a truncated pyramid crowned with a characteristic sikhara. Four subsidiary towers of the same shape were placed at each corner of the podium in a quincunx arrangement.

Community Halls

Buddhist monks met regularly to recite the texts relating to public confession. The building associated with these meetings has been identified as the chapter house. This was large enough to house the whole company of monks and the more elaborate examples had an upper storey, used as a library. The **Brazen Palace at Anuradhapura**, originally, according to the Mathawansa, nine storeys high, was a multi-purpose building of this kind, where only the ground floor was

used as a chapter house and the other storeys as residential accommodation. Only the 1600 stone columns of the ground floor remain, forty in each direction and about 2 m (7 ft) apart.

Another type of community hall within Buddhist monasteries was the sannipathasala or the hall of administration. One of the finest of these was the **sannipathasala at Mihintale** (eighth century), which has a central seat on a platform of stone for the presiding monk. The monks and laity met regularly in such halls to carry out the day-to-day business of the community.

There is a ruined preaching hall—another type of community building for the dissemination of religious knowledge to the laity—at the **Jetavana Monastery, Anuradhapura** (c. eighth century). Like many other Buddhist buildings, such halls often had four entrances facing the cardinal points, symbolically to invite the public from the four quarters to hear the word of the Buddha. The earliest type of monastic residence was a single free-standing cell, certain features of which were regulated by the Vinaya or Code of Discipline. The earliest were the single-room residences at **Sanchi** and at **Maluva** (sixth century BC). Rock-cut caves for monastic cells probably followed the design of the free-standing type but are better preserved. This is borne out in the **cave-cells in the Barabar Hills, at Rajagriha** and at **Sita Marhi**, all in Bihar, which date from the second and third centuries BC, and where features such as eaves and timber joints are simulated in solid rock. The cells at **Bagh, Sarpa and Pavan Gumpah, Orissa**, also suggest a developed single-unit residence dating back to the second century BC. In the next stage of evolution, two or three cells were joined together in a row, as at **Udayagiri and Khandagiri** (second or first century BC). Specifically, amongst these rock-cut buildings of Orissa, at **Ganesha** there are two cells and at **Rani Gumpah** four on each of two levels.

The cells at **Taxila** represent a further stage of development with two rows of cells (p.758C), one to the north and the other to the west, with the entrance facing a common compound. The monks' cells and the associated stupas (p.760B) demonstrate well the Hellenistic influence in the north-west of the subcontinent. Monastery 'G' at **Taxila** and that at **Nagarjunakonda** are the earliest known free-standing quadrangular monasteries.

Perhaps the most typical is the quadrangular monastery at **Takht-i-Bhai** (second century BC to second century AD) (pp.757G, 760C). A number of simple cells are ranged round a quadrangle; the main stupa is placed adjoining this quadrangle in a second courtyard which is crowded with smaller votive stupas. There are several larger chambers for assembly or dining. Walls are built of stone blocks, dressed to a fair face on the outside surfaces, but not squared along the sides. The interstices are filled with much smaller fragments of stone, firmly wedging the large

blocks. All appear to have been laid dry, and were probably originally thickly rendered with lime stucco. All roofs have disappeared—they were of wood and thatch, or tile—as has most of the painted stucco with which the masonry was originally faced. Apart from that on the stupas and their bases, there seems to have been little carved ornament on buildings. The Corinthian column appears frequently in miniature in the carved aedicules on stupa bases, and also as full-sized fragments detached from their original contexts. The **monastery at Nalanda** (Bihar), which flourished in the seventh and eighth centuries AD, represents the last phase. Of great size, it served as a Buddhist university. A stupa excavated there retains little of the Graeco-Roman characteristics of the earlier types: the simple rectangular base with the drum supporting a dome, all that remains of the hemispherical stupa-mound, has been raised on a high four-tiered rectangular plinth, forming an ambulatory terrace around it. Mahayana Buddhist influences from Nalanda spread to south-east Asia. A Srivijaya king from Buddhist Indonesia (Sumatra) founded a monastery for Indonesian pilgrims studying at Nalanda (ninth century).

The rock-cut **Cave No. 12 at Ajanta** and that at **Kondave** may even be of an earlier period and contain monks' beds carved from the rock. Floors were carved one above the other to form units of more than one storey with stairways linking the levels.

Some of the stricter sects, for example those in the major monasteries of **Anuradhapura** in Sri Lanka, did not accept the quadrangular plan and evolved a design in which there were five distinct dwelling units. Four of the buildings were placed at the corners of a rectangle and a fifth, the centre cell, was occupied by the chief priest and was also used as a classroom. An upper storey served as the library. The four smaller cells also had upper storeys and took about six pupils each. There were residential units of this kind around all the monasteries of **Anuradhapura**, for example, each housing between 3000 and 5000 monks. The Panchavasa monks, adhering to the strict requirements of the Vinaya, placed these five sacred buildings on a raised platform with individual two-storey cells arranged in a rectangle around it. The number of monks in a monastery depended on the number of quadrangles of cells: the **Toluvila Monastery at Anuradhapura** had three sets of these concentric rectangles.

Refectories

Buddhist refectories were used to stock, cook, serve and distribute one meal a day, before noon. There are remains of ancient **refectories at Anuradhapura** (fourth to ninth centuries), where the troughs were large enough to feed from 2000 to 5000 monks. They

were housed in single-storey buildings, approximately square in plan and usually with a courtyard and an entrance facing the road. Roofs were supported on granite columns and covered with flat terracotta tiles.

Baths

Buddhist monks bathed in either hot or cold water and junior monks cared for their teachers. It is again in Sri Lanka that the best-preserved examples of these pools are to be found.

There are two pools at **Anuradhapura**, one larger than the other, dating from the eighth century. There were hot water baths for which the water was heated in large pots. A central courtyard was often designed as a water trough about 0.6 m (2 ft) deep. The older monks sat on a ledge to dip their heads into the bath whilst the pupils bathed them with hot water from pots kept at the rear. Stands for such pots served the **hot water baths at Puliyankulama Monastery, Anuradhapura** (tenth century) (p.757A). The roof of the building rested on stone pillars and the exterior wall screened the bath. The central water trough was open to the sky, and the water was drained through underground ducts.

The **Reservoir of Kalawewa** (fifth century) is an outstanding example of the technical virtuosity of Sinhalese engineers in the handling of water. It covers an area of 25 sq km (10 sq miles), and supplied water by a canal 98 km (54 miles) long to **Anuradhapura**. Other characteristic water-works were the bathing tanks, beautifully constructed in stone, with flights of stone steps and decorative stone vases, as in the **Kuttam Pokuna** (twin tanks), **Anuradhapura** (p.763C), and in pleasure-garden baths, such as those of **Ran Masu Park, Anuradhapura** (eighth century and earlier). Boulders are used as part of the architecture, and water cascades down the rock over bas-reliefs of elephants sporting in a lotus-pool.

The so-called **Lotus Pool at Polonnaruwa** (p.763A) is an elegant if diminutive example. There are five stone steps, each in a flower-like, scalloped shape, descending to a depth of about 1.3 m (4 ft 6 in) at the centre of the pool, and 7.5 m (25 ft) across the top at its widest point.

Mihintale (second century) has been called the Medina of Buddhism. It stands on a hill-top 300 m (1000 ft) up, rocky and forested, nearly 13 km (8 miles) north-east of **Anuradhapura**. It was here that Mahinda Thera, the Emperor Asoka's son, preached to the court in the third century BC, and the monastery, regarded as the cradle of Sinhalese Buddhism, has many associations with the royal missionary. The city is famed also for the **Naga Pokuna** ('snake' bathing pool), 40 m (130 ft) long, hewn out of the rock with an immense carved five-hooded cobra poised over the pool (p.763B).

Secular Buildings under Buddhist Influence

The best-known of these buildings are in Sri Lanka. From the Anuradhapura period is **Sigiriya** (sixth century), a romantically-situated rock fortress-palace (p.765A), built as a defensive eyrie but developed into a splendid city with terraced pleasure-gardens and pools with cascades (p.765D). Immense granite boulders were used as shelters (with painted ceilings) (p.765B) and supported elevated pavilions, of which only the notches cut in the rock to receive the superstructures now remain. Some of the frescos survive in the main access gallery (p.765E) on the west side of the 120 m (400 ft) high outcrop of red granite. Sigiriya was a considerable engineering and architectural achievement—the fortress-palace on the top of the rock was built in brick (p.765C), and at the end of the gallery was approached by a stairway between gigantic lion-paws of brick and stucco, and by ladders scaling the near-vertical cliff-faces protecting the summit.

That the tradition of building mountain fortresses continued is indicated by a much later example which even post-dates the decline and abandonment of Polonnaruwa. It is the **rock-fortress of Yapahuwa** (fourteenth century) (p.766A). The gateway, stairways and sculptures are reminiscent of Cambodia and Java.

Of the **Palace, Kandy** (sixteenth to nineteenth centuries), only a part remains: the Queen's Palace, now a museum, and the Audience Hall, the latter epitomising Kandyan wood construction. The long open-sided pavilion with a shallow stone plinth and stone floor, and four rows of wooden columns, richly carved, comprises a central nave and side aisles.

Stambhas and Laths

These were free-standing monumental pillars with shafts of circular or octagonal section on which inscriptions were carved. Capitals were usually bell-shaped and crowned with animal supporters bearing the Buddhist 'chakra'—the 'wheel of law'. The capital of the **stambha at Sarnath**, near Benares, is used as the emblem of the Republic of India. There are others at **Allahabad**, at **Lauriya Nandangarh**, Nepal (p.766B), and near **Kabul**, Afghanistan, all probably of the third and fourth centuries. When associated with Jain buildings, they may carry human figures or other symbols or decorated miniature pavilions. In the case of **Hindu buildings**, stambhas were often used as pedestals for light sources, as were the **stambhas at Ellora**, before the rock-cut **Kailasa Temple** (p.766C). They were nearly 15 m (50 ft) high, square in plan with banded decoration and rectangular relief panels on the upper part of the main shaft.

Jain Architecture

There are rock-cut Jain temples at Ellora further to the north-west in the Barabar Hills, but it is through the increasingly elaborate working of stone in their free-standing temples from the eleventh to the seventeenth centuries that the characteristics of Jain architecture are best known. The Jains believed in the efficacy of temple building as a means of acquiring virtue and their temples were built in close-knit groups—temple-cities—the largest with hundreds of shrines, many of them small, commissioned by individuals. Groups of temples and individual shrines vary in size and were conceived as places set apart for devotion to the pantheon of Jain dynasties and for no other purpose. The principal period during which Jain temples were initiated was from the late tenth to the seventeenth century.

Palitana (pp.767A, 768A) covers both crests of the sacred **Satrunjaya hill and Kathiawar peninsula** in **Gujarat**. It consists of large numbers of temples and shrines ranging greatly in size and extending in time from the **eleventh century onwards (following the Mongol and late Moghul/Muslim incursions)** and up to the **seventeenth to nineteenth centuries**. Also displayed here in almost all its manifestations in stone is the Jain pleasure in elaborate interior detail and exquisite finish, almost for its own sake—the fabric is **lined with lace or brocade regardless of the cut of the garment**. The largest temple is the **Kharataravasi Tuk** (1618) which stands on the north side: it is a two-storey temple and has a **sikhara** some 29 m (96 ft) in height.

There is another temple group in the Kathiawar peninsula at **Girnar**, in the hills to the north of Junagadh. The **Temple of Neminath** (thirteenth century) is the largest of the most significant group, near the summit of the hill on which the temples stand. The temple itself has been much restored but stood in an impressive courtyard surrounded by cells facing an enclosed passage; each cell contained the figure of one of the Jain deities.

The **Jain temple city in Mount Abu** (p.767B) in **Rajasthan**, also with buildings ranging in date from the tenth and eleventh up to the seventeenth century and later, is perhaps the best-known example. The **Dilwarra Temple** (1032) (p.769), built of white marble, is typical of the group. It has a large portico-hall, the columns of which are highly decorated and crowned with bracket capitals carrying raking struts, and a second corbelled capital supporting the roof beams. Wall openings have corbelled brackets, and the carved interior of the corbelled dome roof bears out the analogy with lace suggested above. In common with the majority of Jain temples, the artistic quality of the carved ornament falls short of the technical achievement.

The predilection of the Jains for picturesque sites for their groups of temples is well exemplified above and in other lesser collections of temples such as that near Gawilgarh to the north-west of Amravati in north central India; it lies in a deep wooded valley with a stream which has a number of waterfalls.

The temple, Ranpur (1439) (p. 768B), on the side of the Aravalli Mountains in Rajasthan, was also sited in a remote valley in a position of natural beauty. It stands on a high substructure some 60 m (200 ft) square, surrounded by eighty-six cell-shrines of varied shapes and sizes, each of which is covered by a sikhara-shaped roof. There are five principal shrines with four open courts between them. Twenty domes, 6.4 m (21 ft) in diameter, supported on over four hundred columns, are placed symmetrically in groups of five round the shrines in each corner. The central dome of each group is three storeys high and 11 m (36 ft) in diameter. The domes are formed by corbelled courses of elaborately carved masonry. The virtuosity of the craftsmanship again is typical of Jain temples.

Later Jain temples, mainly of the sixteenth and seventeenth centuries, are to be found—for example in north central India near Gawilgarh and at Sonagarh, near Datia—in some cases in locations used for older buildings some of which were sacked by the Moghuls. Many of these later buildings show the influence of Islamic design and mark the end of the classical central period of Jain architecture.

Brahmanical and Hindu

Temples with Curved Sikhara Roofs

The Kandarya Mahadeva Temple, Khajuraho, in central India (tenth century) (pp. 771A, 772), is characteristic of the northern style. It has a garbhagriha approached through a series of mandapas, the former intended for religious offerings and devotion, the latter for the congregation and for ritual music. The inner core of space is restricted but widens into the shrine itself. The highest point of the central dome rises to 35 m (116 ft), has a maximum ground length of 34 m (109 ft) and is 18 m (60 ft) wide. The interiors are covered with corbelled domes. At lower levels the sculptures depict scenes of everyday life and at the upper levels fade into geometric patterns which continued the lace-like character of the architecture. The curvilinear roof ends rather abruptly to form a narrow neck supporting the amalaka pinnacle. The sides of the main sikhara are enriched with miniature reflections of the main roof shape and there are nearly a thousand sculptured figures on the temple.

The most distinguished group of temples of the northern style are gathered around the great Ling-

araja Temple at Bhuvaneshwar (ninth or tenth century) (p. 771B) which has the finest of all the curved sikhara roofs, covering the low, single-storey garbhagriha. It has mandapas in front of it, one for music and dance and a second for the devotees. The temple reaches a height of 54 m (180 ft) and is 63 m × 23 m (210 ft × 75 ft) in area. Unlike the temples at Khajuraho the overall shape of this building is somewhat squat. The amalaka is exceptionally heavy in appearance, though the pinnacle is slender.

The Parasuramesvara Temple at Bhuvaneshwar (750) (p. 771C) is another smaller example of the curved sikhara roof, which in this case is linked to a simple rectangular mandapa.

In the Jagnath Temple, Puri, Orissa (eleventh century), the garbhagriha served the Visnu cult. The principal mandapa is accessible from all four directions, and there are separate mandapas for dancing and music. The curved sikhara tower of Puri is the tallest of its kind, reaching a height of 58 m (192 ft). The inner shrine measured 45 m × 27 m (150 ft × 90 ft). There is a raised inner courtyard with many small shrines and a second courtyard with wells and bathing facilities. The outer courtyard, about 200 m (650 ft) square, also has exits in all four directions with gopurams over each. Compared with Khajuraho and Bhuvaneshwar, the sikharas at Puri are more serene and graceful, although the amalaka is exceptionally large. The Temple of the Sun at Kanarak (thirteenth century) (pp. 750C, D, 771D), sometimes called the Black Pagoda, 12 km (20 miles) away in the same region, is another elegant example of this style, belonging to the Vishnu cult and dedicated to the Sun God Surya Narayana.

The Temple at Baroli (p. 771E) is a smaller example of this style, dedicated to Siva and dating from the ninth or tenth century. The open, pillared mandapa is elaborately decorated. In front of the main building there is an independent mandapa elegantly worked in stone and with an unusual air of lightness.

Temples with Conical Sikhara Roofs

It was in Mysore that the Chalukyan style came to greatest perfection between 1000 and 1300.

The Temple of Kesava, Somnathpur (thirteenth century) (pp. 773A, 775A), has three shrines facing a central mandapa, each with a garbhagriha and an ambulatory between them. An extra large mandapa on the fourth side has a formal flight of steps down to the temple courtyard, on the periphery of which is a verandah linking the temple with sixty-two cells built into the boundary wall. A formal gateway provides access to this exceptional group of temple buildings which is about 60 m (200 ft) square. The plan-shape of the towers is square but the many projections give the visual impression that they are circular. The truncated cones of the sikharas are finished with flat,

domed-shaped capstones, at a height of about 12 m (40 ft).

The fourteenth-century **Hoysaleswara Temple, Halebid** (p.773B), built later in the Chalukyan period, has twin garbhagrihas facing the mandapas with separate ambulatories between them. Only one of the two pavilions beyond was completed, the other reaching only half its intended height. Although the shrine is just about 9 m (30 ft) tall, the conical roof shape is distinctive, and the intricate carving of the volcanic rock is quite remarkable. There are carved friezes 214 m (700 ft) long depicting animals and birds, and the window openings are filled with elaborately pierced marble slabs.

The **Kuruvatti Temple**, dedicated to Malikarjuna, and also of the later Chalukyan period, has a garbhagriha ambulatory and a wide mandapa. Two porches face north and south. The intricacy of the carving here—particularly of the brackets of the pillars—is typical of Chalukyan work. The **Great Temple at Bellur** (early twelfth century) (p.776A) has a star-shaped garbhagriha and a mandapa with elaborate columns.

Temples with Stepped Pyramid (Prasada) Roofs

During the Pallava period (600–900) at **Mamallapuram** on the south-east coast of India, south of Madras, a number of huge granite rocks were carved into small temples or raths. They reproduce in solid rock some of the early multi-storey temple prototypes, as well as the forms of later buildings, including the characteristic dome-shaped termination of the stepped sikhara roofs. One of these is the **Dharmaraja Ratha** (p.773C), a four-storey monolithic seventh-century building with a stepped pyramid or prasada roof, 8.5 m (28 ft) high. The ground floor consists of a single hall which contained the ritual objects of worship. The upper storeys of the stepped pyramid were non-functional. Pavilion-like structures decorate each floor level at the edge of the slab. The roof ends of these pavilions and even the floor slabs themselves are decorated with horseshoe-shaped windows and with sculptured heads in each.

The five-storey **Shore Temples at Mamallapuram** (p.775B) on the other hand are built in stone masonry, not carved from the solid, and date from the first quarter of the eighth century. Each has a garbhagriha in which the Sivalinga is housed, and a small mandapa, the whole surrounded by a heavy outer wall with little space between for circulation. At the rear are two shrines facing opposite directions. The inner shrine of Ksatriyasimnesvara is reached from the ambulatory passage while the other, dedicated to Vishnu, faces the outside. The outer wall of the shrine to Vishnu and the inner side of the boundary wall are extensively sculptured.

The **Tiruvirattanesvara Temple, Tiruvadigai** (eighth century with later Chola additions in the ninth century) (p.775C), has six storeys. The ground floor has eight separate pavilions with alternating dome and barrel-vault roofs and like the upper floors is decorated with the usual horseshoe windows and animal pilasters. Full-size statues of the deities flank the doorways and fill the niches.

The **Brhadesvara Temple, Tanjavur** (eleventh century) (p.776B) some fifteen storeys, 66 m (216 ft) high, is the grandest example of the square-planned temple. The garbhagriha with the linga shrine at its centre, has only one entrance but the surrounding passage has entrances facing all four directions. Pavilions adorn the floor levels externally and aedicular niches surround the substantial, slightly stilted ribbed dome at the peak of the pyramid.

Temples with Vaulted Roofs

The **Ganesa Ratha, Mamallapuram** (seventh century) (p.777A), is a three-storey rectangular building which diminishes in size with each floor. The vault is horseshoe-shaped, slightly pointed at the apex and there is a large niche of this shape at each end. There are similar horseshoe 'windows' along the vault, breaking the eaves line, and finials along the ridge. Recessed panels between the pilasters either side of the entrance contain human figure sculptures.

The **Salakara Shrine**, a feature in the linked, domed shrines (p.777C) surrounding the great courtyard of the **Kailasantha Temple at Kanchipuram** (eighth century), has a typical corbelled barrel vault very similar in shape to the Ganesa Ratha. The ground floor, raised on a high plinth, has on its long sides twin-columned aedicules with sculptured canopies, each holding elaborate carvings. Lions support the pillars at each corner.

The **Kalaramma Temple at Kolar** (eleventh century) is a sober expression of this type of temple. It has only one floor, with pilasters and a heavy barrel vault set upon a moulded roof projection with a decorated fringe. The horseshoe gable-ends are flat at the apex (as is the vault) and have simple frilled decorations and makara decoration at their heads. The exterior of the vault has the usual window but with little ornamentation; this is in direct contrast with the **Temple of Pandava-p-perumal at Kanchipuram** (c. mid-eleventh century) (p.777B), which is a highly decorated example of the corbel-vaulted temple. Externally the ground- and first-floor elevations are divided into panels by pilasters, their large capitals seemingly detached from the massive projection of the first-floor cornice mould. The upper storeys have boldly projecting pavilions with horseshoe gables. Each tile of the main barrel roof has a decorative motif and there are five heavy stone amalaka-shaped urns along the crown of the vault.

Temples with Apsidal Roofs

The Nakula-Sahadeva Ratha, Mamallapuram (seventh century) (p.779C), like the Dharmaraja Ratha (q.v.), was carved from the solid rock. The plan is rectangular with one semicircular end, a form common in south Asia, for example in the Chaitya Caves, and a twin-columned prostyle porch at the other end. The solid walls of the shrine are divided into panels by an irregularly spaced series of pilasters with capitals and cushion brackets. The columns of the porch are decorated with seated lions.

In complete contrast to the rock-cut temples is the Temple of Tirunagesvara, Kolambakkam (ninth century) (p.779A). It is built entirely in brick with a small apsidal shrine from which much of the plaster has disappeared. The top of the vault has five finials and the window of the apse is also of a decorative design. The Vaidyanatha Temple at Trirumalapodi (eleventh century) is a stone building with three elaborate storeys. The ornate pavilions on the facade follow the structural lines of the edifice. A larger window at the upper level has a makara figure, and eight sculptured bulls representing the vehicle of Siva are placed at the base of the vault over the apse. The giant horseshoe window has reptile-scales carved along its edge and a makara head at the apex. There are other higher examples such as the Adispurisvara Temple, Tirruvoniur (eleventh century) (p.779B), with five storeys and the Tirpurantakisvara Temple at Kuvam (eleventh century) with six. Both are highly decorated, the former with a scalloped gable and sikhara finials.

Temples with Round Timber Roofs

In the Mithranandapuram Temple at Trivandrum (eleventh or twelfth century), plastered laterite walls are carried on a granite plinth and the low-pitched conical roof is tiled. The entrance to the circular shrine is by a formal flight of steps with decorated balustrades. The inner sanctum is square in plan with one entrance only, and has a masonry roof which is independent of the outer structure. Eight stone pillars support the roof timbers which meet in a boss, surmounted externally by a metal pinnacle.

The timber roof of the Sri Vallabha Temple at Tiruvalla in the Allepey district of Kerala (thirteenth century) (p.757H), is covered in metal sheets. Stone walls rest on a granite plinth. There are two concrete walls of which the inner circle circumscribes a square shrine placed at the centre of the building. Ten stone columns set within the inner walls help to support the heavy timber roof. Deep rafters converge to a main boss with a metal finial above. The Chennamathu Temple, Chathanoor (thirteenth century), also of stone, has an elegant conical roof of timber and scalloped tiles with a metal cap and finial. The outer wall

has wide pilasters above deep plinth moulds. Steps up to the podium level have remarkable makara balustrades.

The Koodal-Mankkam Temple at Irinjalakodu (tenth-century and eighteenth-century additions), except for a granite plinth, is constructed entirely in wood, the roof covered with metal sheets. The conical roof rises in two tiers with a clerestory between them. Window openings are ornamented externally. There are four entrances with elaborate balustrades protected by sculptured guardian figures. The central cone of the roof is supported on massive timber columns encircling the square garbhagriha, which was dedicated to Vishnu.

Temples with Wooden Pagoda Roofs

The Chergaon Temple, Chamba (p.779D), is built almost entirely of wood and nestles on the slopes of the Kashmir foothills. It includes the intrinsic elements of a Hindu shrine with a three-storey garbhagriha. The roof, over the garbhagriha, is circular although the plan is square.

The Temple of Mahadeva, Patan, probably dates from about the seventeenth century and is typical of the pagoda-roofed temples of Nepal. It has two storeys, the timber structure elaborately carved, and stands adjacent to the stone, sikhara-roofed temple of Krishna. The principal square of Patan is surrounded by these elegant timber-framed buildings. The Tirucchambaram Krishna Temple, Taliparamba (fourteenth or fifteenth century), has laterite and stucco walls supported by a stone plinth. The temple also has decorations in stucco and fine wood carvings on the timber brackets supporting the eaves. The garbhagriha was two storeys high and there are windows at the upper level.

There was a tendency for the Dravidian temples of the south to grow concentrically around quite small local village temples, ever larger areas being enclosed to form their courtyards and tanks and to embrace multi-columned mandapas and cloisters. Some of the most spectacular pyramidal roofs of Hindu architecture mark the gopurams or gateways into and between the temple enclosures such as those of the many-partitioned Kailasantha Temple at Kanchipuram (eighth century). These culminate in the great temple complexes of Tiruvallur (fifteenth century onwards) and Madura (seventeenth and eighteenth centuries) (p.780A) and Scirangam, Trichinopoly (thirteenth to eighteenth centuries), where there are fine sculptured columns. Like the shrines and temples themselves, gopurams vary greatly in scale, from the spectacular southern gopurams at Madura (eighteenth century) to the delightful earlier examples such as that giving access to the Nilakanthesvara Temple at Laddigam (tenth century) (p.779E), a single-storey stone gateway with a barrel-vaulted roof; this has a

Chapter 1

BACKGROUND

Extended Description

Egypt and the Ancient Near East

Archaeological sites from the late Pleistocene (c. 20,000–16,000 BC) show the region to have been inhabited by bands of hunter-gatherers. But little of architectural interest predated the beginnings of agriculture about 9000 BC, when the first buildings appeared with the more settled communities of the Natufian culture. It stretched from southern Turkey to the Nile delta. The transition to permanent agricultural villages with a mud-brick architecture took place between 7500 BC and 6000 BC, and by the latter date south-west Asia was dotted with thousands of these villages. The Neolithic period in Anatolia and the Levant produced some of the largest, and architecturally the most impressive, towns. The period 6000–3500 BC was a formative one, marked by a succession of cultures; Hassuna (c. 6000–4500 BC), Samarran (c. 5500 BC), Halafian (c. 5000 BC), Eridu (c. 5400 BC) and Ubaid (c. 4500–3500 BC). By the end of the period, in Mesopotamia there were the beginnings of small, independent city-states ruled by councils and assemblies.

The Nile valley was occupied from the late Pleistocene Age, but early evidence of occupation has been buried under deep deposits of silt. A proto-agricultural economy developed in some areas as early as 12,000 BC but, for the most part, hunting and gathering were the basis of human existence in Lower Egypt until about 6000 BC, and in Upper Egypt until 4000 BC. In the fifth millennium distinct settled cultural groups appeared, but the local Neolithic period began much later, around 3000 BC. Lower Egypt produced the Faiyum (c. 5000 BC) and Merimda (c. 4000 BC) cultures, and Upper Egypt the Badarian (c. 4000 BC), Amratian (c. 3800 BC) and Gerzean (c. 3600 BC) cultures. Around 3200 BC unification was achieved under the god-king, and the historical (dynastic) period began.

The earliest villages, towns and cities of the world, with the developments therefrom, are in themselves of great significance, spanning nearly five millennia

in some parts of the Near East, much less in other parts. The ancient Near East, with Egypt, provides much of the background to western civilisation. The term 'Near East' is here used to cover the Arab states, Israel, Cyprus, Turkey, Iran and the Trans-Caucasian republics of the USSR (Georgia, Armenia and Azerbaijan), as well as Egypt. This part of the book comprehends also the Aegean region, closely linked at first with the Levant and later with the Phoenicians and with the far-flung Persian empire (see Plate 1).

From walled Jericho, Catal Hüyük with its painted shrines, and the seasonal communities of the first settlers in the Zagros highlands of western Iran to the gradual emergence of urban life in Mesopotamia, the construction of city temples and palaces and the rise of the first empires, the story of the ancient Near East should not be over-simplified.

Standing in some sense on one side was Egypt, relatively isolated by geography, though less so than some specialists have seemed to imply. Its precise relations with the rest of the Near East are initially obscure, and not known in detail before the mid-second millennium BC. The panorama of Egyptian state, society and civilisation extends, however, over more than three thousand years until its absorption into the Graeco-Roman world, beginning with the meteoric career of Alexander the Great.

Greece and the Greek Empire

The first major civilisation in Europe developed around the Aegean Sea and has proved to be a great influence on all subsequent European civilisation. The architecture of ancient Greece was the essential origin of European architecture, through its influence on the architecture of the Roman Empire and so, indirectly, of mediaeval Europe.

Greek architecture itself did not develop in isolation. In the more remote prehistoric period distinct regional vernacular styles are discernible, in the east and north Aegean, on the mainland, and in the southern Aegean islands, especially Crete. The geography